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ABSTRACT

In recent years state governments have taken steps to strengthen their economic bases by promoting growth of high-technology industries within their borders. A byproduct of this effort has been an increasing need for information on the geographic distribution of research and development (R&D) expenditures. The information in this report permits detailed analysis of state- and region-specific R&D activities by industry, academia, nonprofit institutions, and federal agencies. The first section contains highlights and summary information on state and regional R&D concentration levels. Comparisons between the distribution of R&D performance and other socioeconomic variables are included. The second section deals more specifically with R&D performance patterns within each of the nine geographic regions. Appendix A details data sources used in the creation of this report. Data are presented in tabular form for state, region, and performance sector in appendix B. Appendix C consists of personnel and funding profiles for each of the 50 states, the District of Columbia, and the total United States. (CW)

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geographic patterns: r&d in the united states

surveys of science resources series
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foreword

In recent years, State Governments throughout the country have taken steps to strengthen their economic bases by promoting growth of high-technology industries within their respective borders. A byproduct of this effort has been an increasing need for information on the geographic distribution of research and development (R&D) expenditures. The information in this report permits detailed analysis of State- and region-specific R&D activities by industry, academia, nonprofit institutions, and Federal agencies.

This report complements ongoing data collection efforts by the Division of Science Resources Studies to measure the extent of State support of R&D, as well as other activities within the National Science Foundation (NSF) which encourage interaction with State policymakers. These activities include:

- NSF/State cost sharing in the conduct of research and education as occurs through the Science and Engineering Education programs, the Research Center programs, and the Experimental Program to Stimulate Competitive Research
- NSF's State Initiative, coordinated in the Office of Legislative and Public Affairs, which focuses on strengthening communication with State officials to pursue mutual goals and to stress the link between the science and engineering enterprise and State economic development

William L. Stewart
Director, Division of Science Resources Studies
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and International Affairs

July 1989

acknowledgments

This report was prepared by John E. Jankowski, Jr., Science Resources Analyst, Economic Analysis Studies Group (EASG).

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Efforts are continually under way to collect the most recent data. For these new data or additional detail, please contact the author at (202) 634-4627.

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background

During the 1980s, States have initiated numerous science and technology (S/T) programs in an effort to foster economic growth and high-technology development.[1] An important component of many such programs is to fund or otherwise encourage in-State research and development (R&D) activity. To do so, States—which have long looked to the academic sector for such R&D performance—are now paying increasing attention to the R&D activities of industry and not-for-profit organizations, academia-industry R&D linkages, and Federal R&D programs, such as the Superconducting Super Collider. This increase in State S/T initiatives has created a need to gain a national perspective on State-specific R&D activities.[2] This report is directed to meet this need.

The National Science Foundation (NSF) collects and maintains data on the resources devoted to R&D in the United States, including:

- the level of R&D expenditures,
- the sources of such funds,
- the sector or organization performing the R&D, and
- the character of work undertaken (i.e., whether it is basic research, applied research, or development).

Although these national estimates provide a rich source of information for researchers and policymakers, one constraint on analysis is the general absence of composite geographic R&D performance data. By piecing together existing—although somewhat disparate—NSF data bases, this report should help to fill that gap.

geographic r&d data sources

NSF collects geographic data on R&D expenditures for the individual sectors of the economy. These data—which cover varying time periods—generally are reported for the institutions *performing* the R&D rather than for those *funding* such activities. In this report, we have derived

[1]See, for example, K. Guild Nichols, *Technology & Growth: State Initiatives in Technological Innovation*, Final Report of the Task Force on Technological Innovation of the National Governors' Association (Washington, D.C., October 1983); Marianne K. Clarke, *Revitalizing State Economies, A Review of State Economic Development Policies and Programs*, National Governors' Association (Washington, D.C., 1986); and Beverly Jones, *State Technology Programs in the United States*, Governor's Office of Science and Technology, Minnesota Department of Trade and Economic Development (St. Paul, Minn., July 1988).

[2]Broad comparative data overviews have been published by Ameritrust/SRI, *Indicators of Economic Capacity* (Cleveland, Ohio, December 1986); and the Corporation for Enterprise Development, *Making the Grade: The 1988 Development Report Card for the State* (Washington, D.C., April 1988). Regionally based interest is exemplified by reports of the Southern Growth Policies Board and the Southern Technology Council, *Science & Technology Trends in the South*, 1989; and the Institute for Illinois/Council of Great Lakes Governors, *Science and Technology in Mid-America* (Washington, D.C., 1989). Data tabulation initiatives at the State level include Donald A. Hicks, *Innovation and Tomorrow's Economy: The Wisdom of Strategic Investments in a Regional Science and Technology Research Base*, Regional Research and Technology Program of the North Texas Commission (Dallas/Fort Worth, Texas, October 1988); and State of Ohio, Office of the Governor, Executive Order 89-7, "Creating the Governor's Commission to Set Forth the Ohio Science and Technology Strategic Plan." (Columbus, Ohio, 1989).

statewide R&D expenditure totals by summing the sector components reported by the Federal Government, industry, and academia, and those estimated for nonprofit institutions. Because 1985 is the most recent year for which industry geographic R&D data are available, the analysis generally is based on that year. Although NSF is now collecting data from the State Governments on State-funded and -performed R&D, similar data are not available for the period covered here.

In 1985, more than $107 billion was spent on R&D activities in the United States. Industrial R&D performance—including that of industrially run federally funded research and development centers (FFRDCs)—reached $78 billion. These data are estimated from a sample survey of about 1,300 companies. Federal agency obligations ($13 billion in fiscal year (FY) 1985) are used to estimate Federal intramural R&D performance. The university sector, including activities of university-administered FFRDCs, conducted $13 billion in R&D in 1985. State-specific R&D data are available for these FFRDCs and doctorate-granting institutions only, which accounted for 99 percent of sector total. R&D conducted by other nonprofit institutions and related FFRDCs reached an estimated $3 billion in 1985. Only Federal budget obligations to this sector, which totaled $2 billion in FY 1985, are available, however, on a by-State basis.[1]

outline of report

The remainder of this report is divided into two sections and three appendixes.

The **first section** contains highlights and summary information on State and regional R&D concentration levels, including 1975–85 trends, sectoral performance, and the relative importance of Federal R&D funding. It also details comparisons between the distribution of R&D performance and other socioeconomic variables.

The **second section** deals more specifically with the R&D performance patterns within each of the 9 geographic regions, particularly emphasizing the 10 States in which more than $3.5 billion of R&D (or 90 percent of total U.S. R&D) was conducted in 1985.

Appendix A provides a detailed description of the NSF data sources used for this report.

Appendix B is a set of tables on the R&D funding totals for each State, region, and R&D-performing sector. Included, for example, are:

- industry-specific information for the industrial sector,
- field-specific totals for the academic sector, and
- a breakdown of R&D funding and performance by Federal agency.

Appendix C consists of personnel and funding profiles for each of the 50 States; Washington, D.C.; and the total United States. Included, for example, are:

- number of scientists and engineers,
- science and engineering graduate enrollment,
- population and labor force,
- R&D performance by sector,
- Federal R&D obligations by agency, and
- gross State product (GSP) and personal income.

[1] See appendix A for a more complete discussion of the data sources used in this report.

highlights

regional distribution of r&d expenditures

The United States spent about $107 billion on R&D activities in 1985. R&D undertaken in the Pacific region (including Alaska, California, Hawaii, Oregon, and Washington) accounted for 24 percent of the national total (chart 1). This figure is considerably higher than the R&D accounted for in each of the other eight geographic regions.

The second largest R&D-performing region in the United States was the Middle Atlantic, which consists of New Jersey, New York, and Pennsylvania. These three States collectively accounted for 18 percent of the R&D performed nationwide. R&D performance in the Great Lakes region (Illinois, Indiana, Michigan, Ohio, and Wisconsin) was third highest nationally (16 percent of total), and was followed by the 13-percent share reported for performers in the eight South Atlantic States and Washington, D.C. The smallest R&D-performing region was the Southeast: Alabama, Kentucky, Mississippi, and Tennessee collectively accounted for only 2 percent of the U.S. total.

r&d concentration within regions

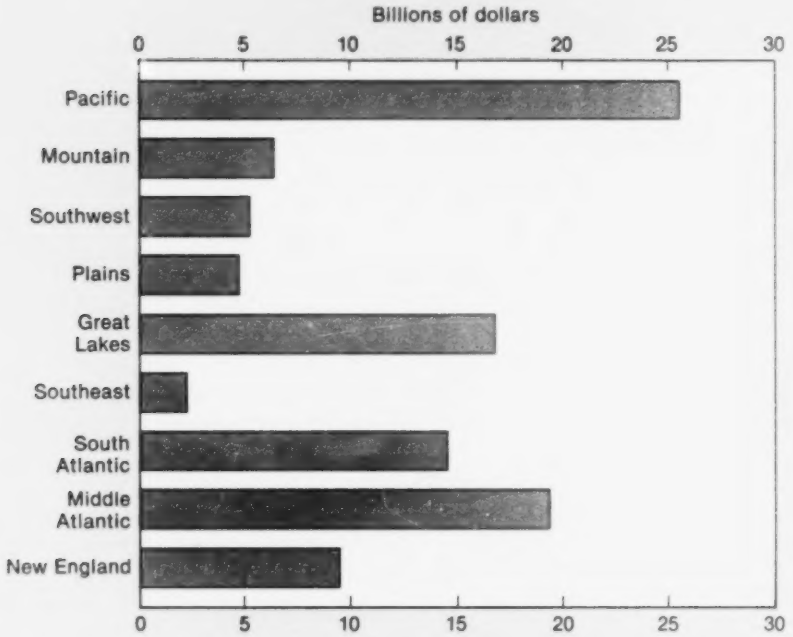
Although the Pacific region led the Nation in terms of total dollars spent, its R&D performance took place mostly in California; 87 percent of the region's R&D total was conducted there. In contrast, R&D performance in the industrial centers of the Great Lakes was considerably less concentrated. Michigan performed 38 percent of the regional total. Illinois and Ohio each conducted about 20 percent, and Indiana and Wisconsin performed the rest (table 1). Each of the three Mid-Atlantic States was among the Nation's leaders in terms of total R&D performance, although New York alone accounted for 43 percent of the region's R&D effort in 1985.

Among the six remaining regions, R&D performance generally is highly concentrated in just a few States. For example:

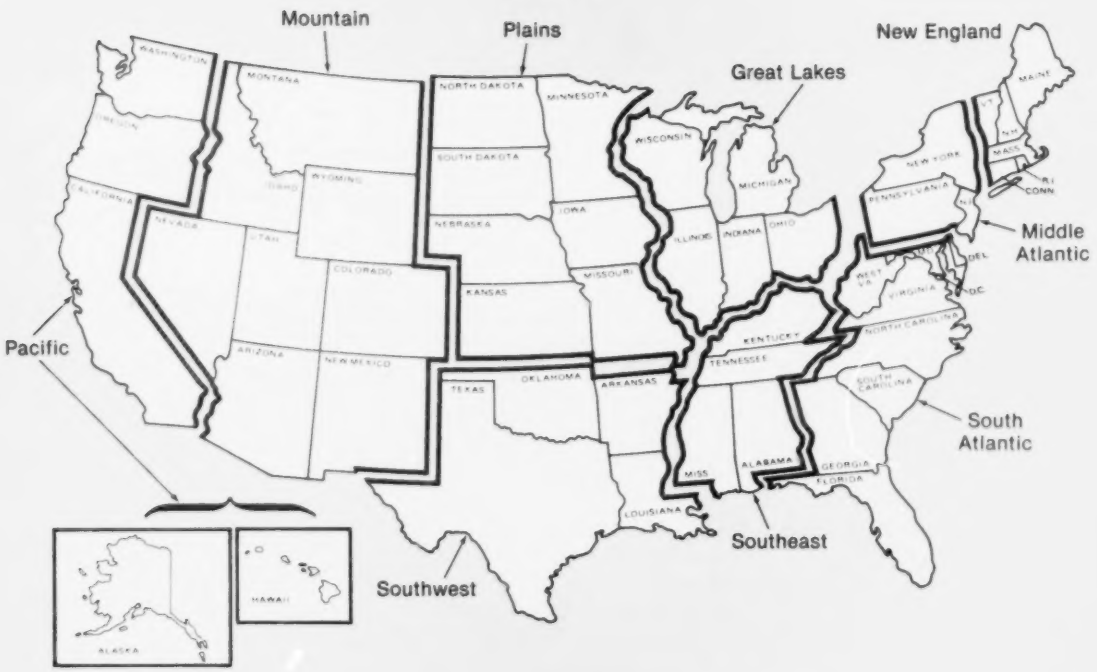
- Massachusetts accounted for 63 percent of the R&D expenditures in the six New England States (9 percent of the U.S. total),
- Texas accounted for almost 84 percent of the R&D expenditures in the four Southwest States (5 percent of the U.S. total),
- Minnesota accounted for about half of the R&D expenditures in the seven Plains States (4 percent of the U.S. total), and
- Maryland accounted for one-third of the R&D expenditures in the South Atlantic region (eight States and the District of Columbia); this was 14 percent of the U.S. total.

Even in the Southeast (2 percent of U.S. total), where R&D spending was uniformly low in each of the region's four States, 43 percent of the regional total was performed in Alabama alone.

Chart 1. Distribution of total R&D performance across regions: 1985



Region



NOTE: Approximately $3 billion of the national R&D total are geographically undistributed.
SOURCE: National Science Foundation, SRS; table B-1

Table 1. Distribution of R&D performance by States within regions and by regions within the United States: 1985

[Dollars in millions]

State	Percent of region	Region R&D = Percent of U.S.
Connecticut	24	
Maine	1	
Massachusetts	63	New England
New Hampshire	4	$9,538 = 8.9% of U.S.
Rhode Island	5	
Vermont	2-3	
New Jersey	35	Middle Atlantic
New York	43	$19,441 = 18.1% of U.S.
Pennsylvania	22	
Delaware	6	
District of Columbia	12	
Florida	16	
Georgia	6	South Atlantic
Maryland	34	$14,616 = 13.6% of U.S.
North Carolina	8	
South Carolina	3	
Virginia	13	
West Virginia	1-2	
Alabama	43	
Kentucky	14	Southeast
Mississippi	11	$2,258 = 2.1% of U.S.
Tennessee	33	
Arkansas	1	
Louisiana	7	Southwest
Oklahoma	8	$5,230 = 4.9% of U.S.
Texas	84	
Illinois	25	
Indiana	10	Great Lakes
Michigan	38	$16,798 = 15.6% of U.S.
Ohio	22	
Wisconsin	6	
Iowa	10	
Kansas	8	
Minnesota	47	Plains
Missouri	30	$4,680 = 4.4% of U.S.
Nebraska	2	
North Dakota	1	
South Dakota	*	
Arizona	20	
Colorado	20	
Idaho	7	
Montana	1-2	Mountain
Nevada	2-3	$6,387 = 5.9% of U.S.
New Mexico	41	
Utah	8	
Wyoming	*	
Alaska	*	
California	87	Pacific
Hawaii	*	$25,487 = 23.7% of U.S.
Oregon	2	
Washington	10	
		Undistributed
		$3,019 = 2.8% of U.S.

*Less than 1 percent.

NOTE: Because of rounding, percents may not add to 100.

SOURCE: National Science Foundation, SRS, table B-1.

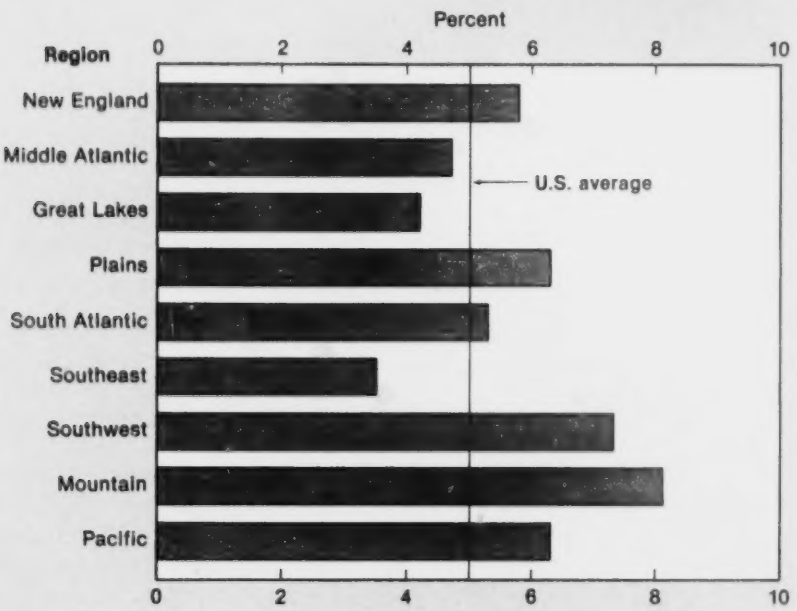
regional r&d growth: 1975–85

Regional R&D performance growth has varied considerably since the midseventies. Between 1975 and 1985, the eight Mountain States recorded the regional high of 8.1-percent average annual growth, adjusted for inflation (chart 2). Most of this R&D growth resulted from major spending increases in Department of Energy's (DOE's) FFRDC and defense-related activities. The Southwest also experienced substantial R&D growth (7.3 percent annually), although the neighboring Southeast region had the slowest growth rate (3.5 percent) during this 10-year period. The largest R&D-performing regions, Pacific and New England, were in the middle range in terms of R&D growth rates. The two regions experienced real annual growth of 6.3 percent and 5.8 percent, respectively. Nationally, real R&D expenditures grew at a 5-percent rate during the 1975–85 period.

In spite of the varying rates of R&D growth over this period, there was no change in the regional rankings. The largest R&D-performing regions in 1975 were the largest such performers in 1985. The smallest R&D regions in 1975 were still the smallest in 1985. In terms of their percentage shares of the national R&D total, however, the Pacific region showed the largest gain and the Great Lakes States showed the largest relative declines (table B-12).

Chart 2. Average annual R&D performance by region: 1975-85

[Based on 1982 real dollars]



SOURCE: National Science Foundation, SRS; table B-12

demographic and economic comparisons

The geographic distribution of R&D performance differs somewhat from that of several of the more frequently cited socioeconomic indicators, such as population, income, GSP and manufacturers' shipments. Regional shares of R&D performance, however, follow distribution patterns of Federal R&D obligations and employed Ph.D. scientists and engineers (table 2).[4]

Coastal regions, particularly in the Northeast (New England and the Middle Atlantic) and West (Mountain and Pacific), account for disproportionately more R&D than is indicated by their shares of national income, output, population, or labor force. For example, New England's share of the R&D total (9 percent) is about one-third greater than its share of the other national totals (between 5 percent and 7 percent each). In contrast, the R&D percentage shares accounted for by the Southern regions (particularly the Southeast and Southwest, but also the South Atlantic) and two Central regions (Great Lakes and Plains) generally fall below their percentage shares of these other socioeconomic variables. Perhaps the most notable example of such disparities is provided by the four Southwestern States. Although they collectively accounted for between 10 percent and 12 percent of the Nation's population, income, manufacturing output, and GSP, relatively little R&D—only 5 percent of the U.S. total—was performed there.

[4]Zero-order correlations, using data from the 50 States and the District of Columbia, tend to confirm these observations (see last row, table 2). It is to be expected that R&D performance is highly correlated with Federal R&D funding (0.923) and doctoral S/E employment (0.937). The Federal Government was the source of about half the U.S. R&D in 1985. Further, one-third of all employed doctoral scientists and engineers reported R&D as their primary work activity (compared, for example, to 27 percent who listed teaching).

Table 2. Comparison of R&D performance with other demographic and economic variables: 1985

Region	Total R&D	Federal		Gross State product	Disposable income	Manufacturing shipments	Resident population	Labor force	Doctoral scientists and engineers	Science/ engineering graduate enrollment
		R&D obligations	Total funds							
	(Dollars in millions)						(In thousands)			
Total distributed ...	104,436	47,078	761,642	3,962,246	3,320,072	2,253,724	238,737	115,709	423,642	432,162
	Percent									
Northeast	27.8	22.9	21.3	22.1	23.4	19.9	20.9	21.0	26.0	25.4
New England ..	9.1	9.7	6.3	5.7	6.1	5.5	5.3	5.7	7.8	7.7
Middle Atlantic	18.6	13.3	15.0	16.4	17.3	14.4	15.6	15.3	18.3	17.7
North Central	20.6	10.6	21.7	23.7	24.2	31.8	24.8	25.1	20.6	22.9
Great Lakes ...	16.1	6.8	13.8	16.7	17.2	23.8	17.4	17.5	14.6	16.8
Plains	4.5	3.8	7.9	7.0	7.0	8.0	7.4	7.6	6.0	6.1
South	21.1	31.3	34.6	32.6	31.1	32.6	34.3	33.7	30.0	27.5
South Atlantic .	14.0	23.7	19.4	15.7	16.1	13.8	16.8	16.8	17.8	14.7
Southeast	2.2	3.6	5.7	5.1	4.9	6.5	6.3	5.9	4.1	3.8
Southwest	5.0	4.0	9.5	11.8	10.1	12.3	11.1	11.0	8.1	9.0
West	30.5	35.2	22.4	21.6	21.3	15.6	20.0	20.2	23.6	24.1
Mountain	6.1	9.6	5.5	5.2	4.9	2.9	5.4	5.4	6.4	5.6
Pacific	24.4	26.5	16.9	16.3	16.4	12.7	14.7	14.8	16.9	18.5
Correlation with total R&D[1]	1.00	.923	.907	.880	.897	.785	.352	.862	.937	.863

[1]Based on data for the 50 States and the District of Columbia. All results are significant at the 0.01 level.

SOURCES: National Science Foundation, SRS; Bureau of the Census; Bureau of Economic Analysis; and Bureau of Labor Statistics.

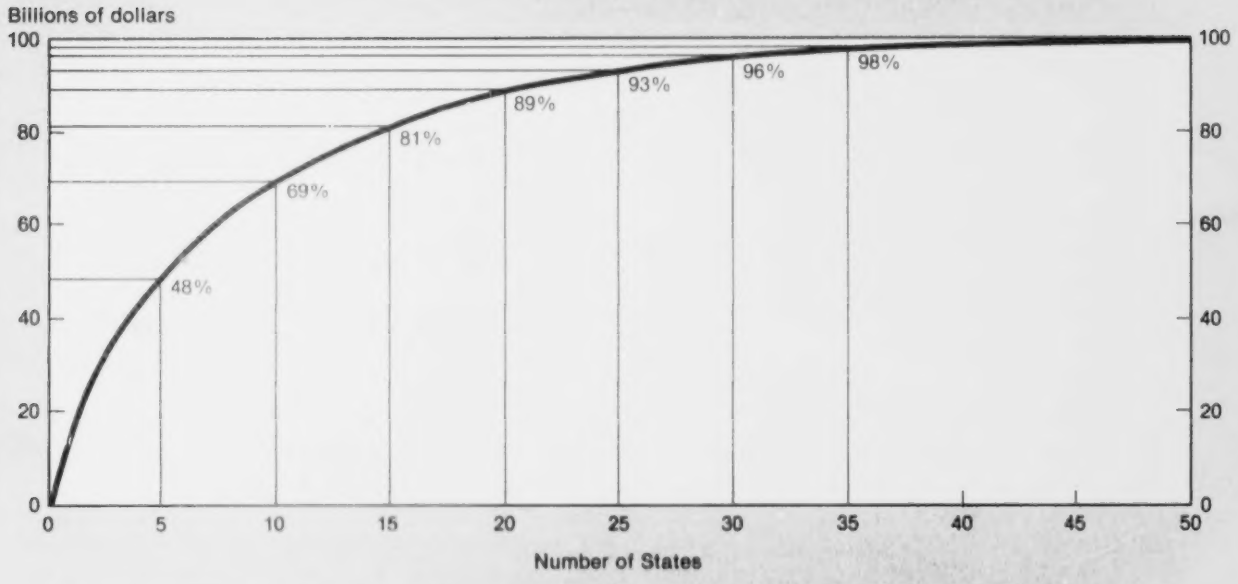
state distribution of r&d expenditures[5]

State distribution of R&D performance is rather highly concentrated (chart 3). Five States (California, New York, New Jersey, Michigan, and Massachusetts) accounted for half the U.S. R&D total, and 10 States (adding Maryland, Texas, Pennsylvania, Illinois, and Ohio) accounted for two-thirds of the total. California's R&D performance reached $22 billion in 1985; total R&D ranged between $3 billion and $9 billion in each of the other nine leading States. Performers in each of the next 11 States and the District of Columbia (table B-2) spent more than $1 billion and—combined with the first 10 States—collectively accounted for 90 percent of the Nation's R&D. In contrast, only 8 percent of the U.S. R&D effort was performed in the next 13 States; performers in the remaining 16 States accounted for a total estimated 2-percent share. Consequently, the smallest 30 States collectively accounted for only 10 percent (roughly $10 billion) of the R&D conducted nationwide.

The R&D distribution patterns of the top 10 States have remained rather stable over time. Each of the States ranked among the top 10 in 1985 also were among the top 10 R&D States in 1975. As a percentage of the U.S R&D total, these 10 increased their share from 64 percent to 66 percent over this period. The largest relative gains were reported for Texas (moving from 10th to 7th) and New Jersey (from 5th to 3rd) (chart 4). The R&D undertaken in Pennsylvania showed the largest relative decline among these 10 leaders—its rank dropped from fourth in 1975 to eighth in 1985.

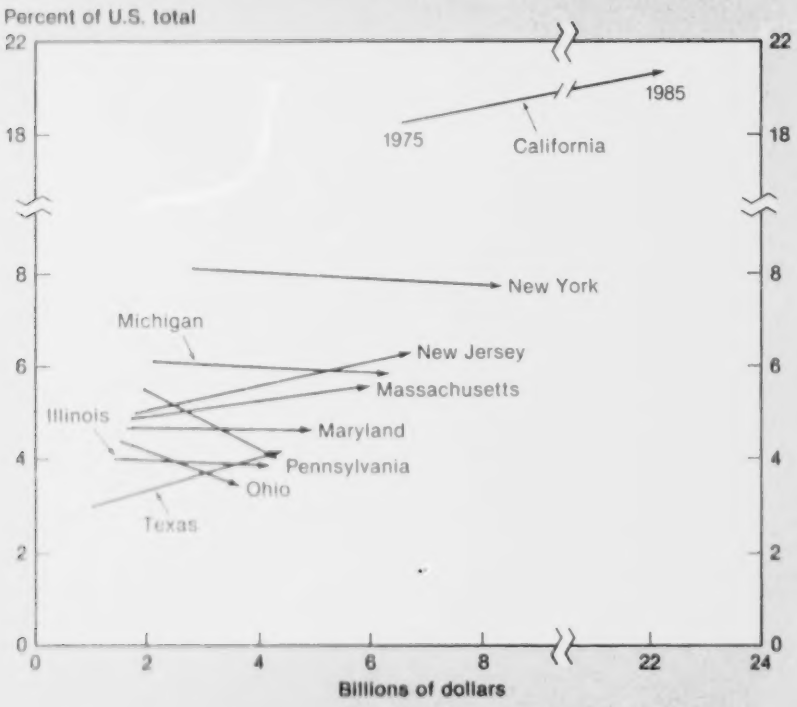
[5]Unless otherwise indicated, information on State rankings and sectoral performance is based on R&D expenditures that are distributed by State. The percentage share calculations exclude undistributed R&D expenditures, which equal 3 percent of the national total. See appendix A for a description of the undistributed totals.

Chart 3. Cumulative distribution of R&D performance by State: 1985



SOURCE: National Science Foundation, SRS; table B-2

Chart 4. States with largest R&D performance: 1975 and 1985



SOURCE: National Science Foundation, SRS; table B-12

state concentration in r&d-performing sectors

Within individual sectors, academia's R&D performance is somewhat more dispersed geographically than are industrial and Federal R&D spending—but not by much. Twenty-five States accounted for 90 percent of the total R&D performed by the academic sector in 1985, compared to the 20 and 17 States that accounted for 90 percent of industrial and Federal R&D, respectively. The 10 largest States in terms of academic R&D performance accounted for 67 percent of the $13 billion spent in 1985. Comparable shares for top 10 Federal and industrial performers were 80 percent and 73 percent.[6]

Not coincidentally, most of the States that are national leaders in total R&D performance also are leading R&D performers in one or more individual sectors of the economy (table 3). For example, of the 10 States that lead in total R&D performance, all but Maryland were ranked among the top 10 industrial performers and all but Ohio were ranked among the top 10 academic performers. While State rankings are somewhat more mixed in the Federal and nonprofit sectors, each of the 10 leaders in total R&D is ranked among the upper half of R&D performers in both of these two sectors. State R&D performance rankings thus are, in general, strikingly similar across all sectors.

Table 3. State rank by R&D-performing sector: 1985

State	Total	Industry	Federal	Academia	Other nonprofits[1]
Alabama	23	28	8	27	15
Alaska	43-51	40-51	35	43	50
Arizona	21	17	18	21	34
Arkansas	43-51	40-51	38	41	38
California	1	1	3	1	2
Colorado	20	18	17	16	8
Connecticut	14	11	14	18	27
Delaware	24-26	19	50	46	37
District of Columbia	17	40-51	2	33	6
Florida	13	13	9	17	26
Georgia	24-26	25	23	14	28
Hawaii	43-51	40-51	42	36	29
Idaho	32	26	44	47	35
Illinois	9	8	22	5	9
Indiana	18	15	27	23	31
Iowa	30	30	40	24	42
Kansas	36	33	46	32	40
Kentucky	38	35-39	33	37	49
Louisiana	37	35-39	31	25	32
Maine	43-51	40-51	49	48	23
Maryland	6	14	1	7	13
Massachusetts	5	5	13	3	1
Michigan	4	3	25	9	16
Minnesota	15	12	32	19	12
Mississippi	39-42	40-51	16	38	25
Missouri	19	16	28	22	20
Montana	43-51	40-51	41	45	44
Nebraska	43-51	40-51	45	34	36
Nevada	39-42	40-51	24	49	48
New Hampshire	35	32	29	39	46
New Jersey	3	4	5	10	25
New Mexico	11-12	21-22	4	4	14
New York	2	2	20	2	3
North Carolina	22	21-22	15	12	19
North Dakota	43-51	40-51	43	40	43
Ohio	10	9	7	11	10
Oklahoma	34	31	36	30	17
Oregon	33	34	30	26	18
Pennsylvania	8	6	11	8	7
Rhode Island	28	35-39	12	35	22
South Carolina	31	27	39	31	39
South Dakota	43-51	40-51	48	51	51
Tennessee	27	24	21	29	21
Texas	7	7	10	6	11
Utah	29	30	26	28	33
Vermont	39-42	35-39	41	44	45
Virginia	16	20	6	20	4
Washington	11-12	10	19	15	5
West Virginia	39-42	35-39	34	42	47
Wisconsin	24-26	23	37	13	30
Wyoming	43-51	40-51	47	50	41

[1]Rankings based on Federal R&D obligations to nonprofit institutions.

NOTE: Because data for industrial R&D performnace were suppressed for some States, total and industrial sector rankings must be grouped to avoid disclosure. See appendix A, Technical Notes.

SOURCE: National Science Foundation, SRS.

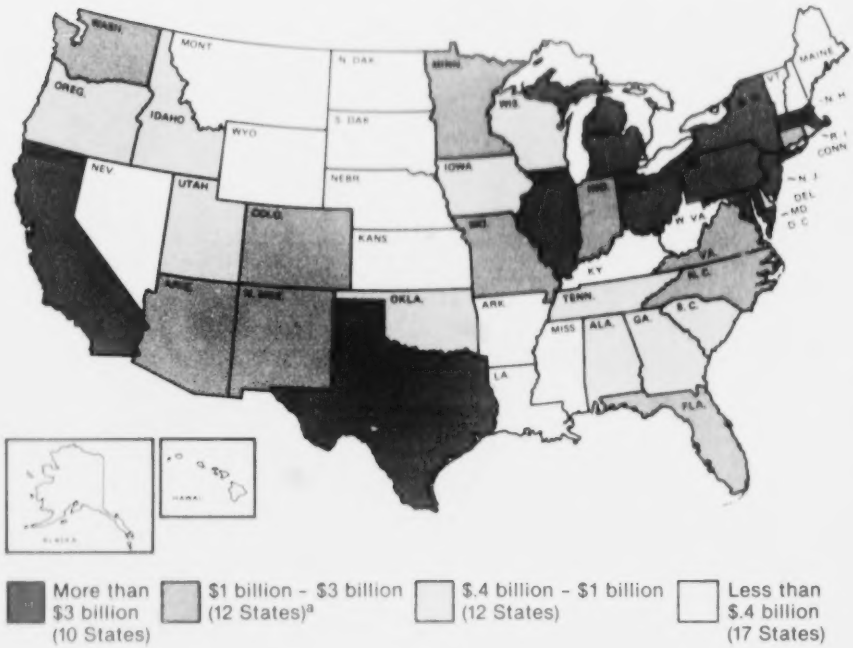
[6]The broader distribution of academic R&D is in part because academia tends to perform research—more than 90 percent of total—rather than development. By comparison, Federal and industrial performers focus on development efforts—60 percent and 75 percent, respectively, of their R&D totals. Because development activities are likely to require large-scale operations concentrated in fewer locations, R&D dispersion thus might be somewhat more attainable for the academic sector than it is for the Federal Government or industry.

ratio of r&d performance to gsp

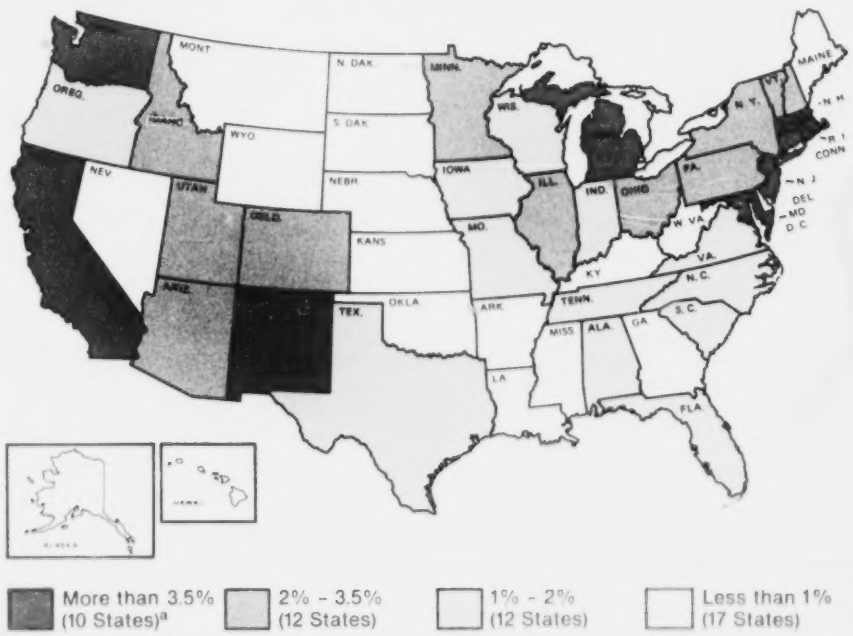
Because the above rankings are based on absolute levels of expenditures, they do not take into account such factors as States' size or economic "health." One way to adjust for such non-R&D-related differences is to divide R&D expenditures by data on GSP.[7] The resulting picture of by-State R&D concentration is somewhat different (chart 5).

Of the 10 largest States in terms of absolute R&D performance, only 5 also were ranked among the top 10 in terms of their R&D/GSP ratios (Maryland, Massachusetts, New Jersey, California, and Michigan). The largest R&D/GSP ratios were achieved by New Mexico (11 percent) and Delaware (8 percent).[8] These two States were ranked about 11th and 25th, respectively, in terms of total in-State R&D performance. Washington, Connecticut, and the District of Columbia also were among the R&D/GSP top 10, although they were not so highly ranked in terms of absolute R&D spending. California and New York, on the other hand, were the top two performers in terms of R&D dollars spent, but were only 7th and 17th, respectively, in terms of their R&D/GSP ratios.

Chart 5. Size of total R&D performance by State: 1985



Ratio of total R&D performance to Gross State Product by State: 1985



[a]Includes the District of Columbia.

SOURCES: National Science Foundation, SRS, table B-3; Bureau of Economic Analysis

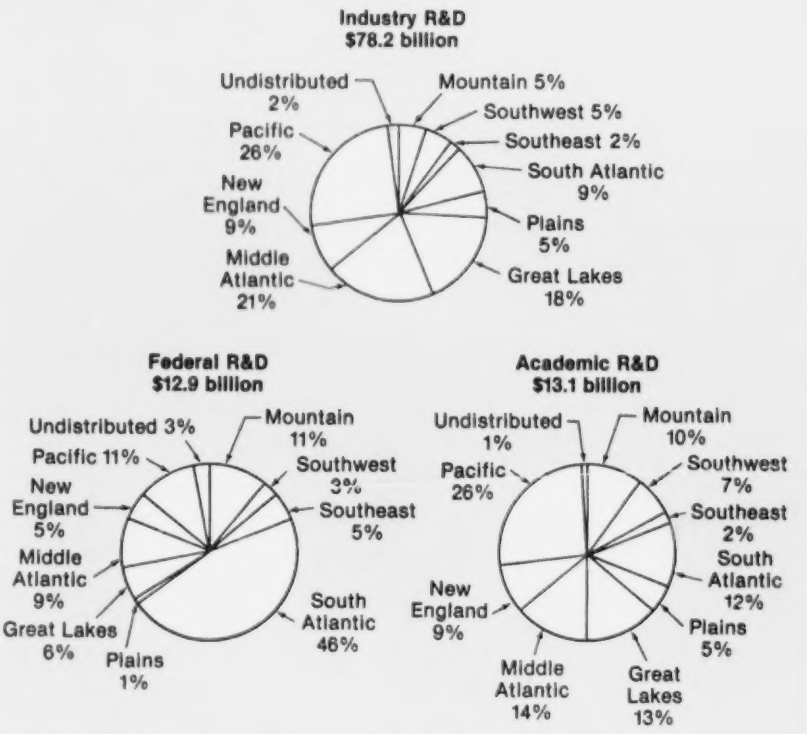
[7]GSP data were published recently by the Bureau of Economic Analysis, U.S. Department of Commerce. See V. Renshaw, E. Trott, Jr., and H. Friedenberg, "Gross State Product by Industry, 1963–86," *Survey of Current Business*, Vol. 68, No. 5 (Washington, D.C., May 1988).

[8]Actually, these ratios are based on the midpoints of the R&D performance ranges in table B-1. The full R&D/GSP range for New Mexico is 10.6 percent to 11.9 percent, for Delaware, it is 7.6 percent to 8.6 percent. At either end of their respective ranges, these two States remain first and second in terms of R&D/GSP rankings.

In contrast to the position shifting experienced by States with high and middle rankings, the very smallest States in terms of R&D performance (the bottom 15) also were ranked among those with the lowest R&D/GSP ratios (i.e., less than 1 percent). These States have uniformly low R&D expenditure and economic output levels.

Nationwide, R&D spending was equivalent to 2.7 percent of gross national product (GNP) in 1985. Performance in 13 States and the District of Columbia exceeded this ratio, whereas the R&D/GSP ratio of 37 States fell below the national mean (table B-3). The median ratio was about 1.5 percent—25 States above and 25 States below.

Chart 6. Distribution of sectoral R&D performance by region: 1985



SOURCE: National Science Foundation, SRS; tables B-1 and B-4

geographic distribution of r&d spending by sector

industry

Of the four sectors of the economy for which detailed R&D data are available—industry, Federal Government, universities and colleges, and other nonprofit institutions—industry accounted for the largest share of R&D performance in each of the nine geographic regions (table B-4). Nationally, industry accounted for 73 percent of the R&D total. Its share of regional performance totals ranged from 47 percent in the South Atlantic States to 84 percent in the Great Lakes States. The Pacific region, however, accounted for the largest regional share (26 percent, or $20 billion) of industry's national R&D effort ($78 billion) (chart 6). Aircraft and missiles companies performed the bulk—23 percent—of the Nation's industrial R&D effort (table B-8), and was the largest industrial R&D performer in 11 States (table B-7).

federal government

Almost half the Federal Government's intramural R&D performance ($12.9 billion) was undertaken in the South Atlantic region (especially the District of Columbia and its neighboring States, Maryland and Virginia). Government's performance accounted for a region-leading 41-percent share of the South Atlantic's R&D total. In contrast, the Federal Government performed only 4 percent of the R&D conducted in both the Great Lakes and Plains regions. Nationwide, Federal agencies performed 12 percent of the R&D total: the Department of Defense (DOD) accounted for 64 percent of the Federal R&D performance effort in 1985 (table B-6). The Department of Health and Human Services (HHS) and the National Aeronautics and Space Administration (NASA) each accounted for about 9 percent of total, and the Department of Agriculture (USDA) performed 5 percent of the Federal R&D.

academia

As a percentage of the academic sector's total R&D effort ($13.1 billion, including FFRDCs), the Pacific region again led all others, accounting for 26 percent ($3.4 billion) of total. Academia, however, accounted for a region-leading 21-percentage-point share of R&D in the eight Mountain States—$1.4 billion.

Much of this sector's regional importance is due to the large role FFRDCs play in the total academic R&D effort. FFRDCs accounted for 51 percent and 57 percent, respectively, of academia's 1985 R&D effort in the Pacific and Mountain regions.

Academia's relative contribution to total R&D was lowest—9.7 percent—in the Middle Atlantic region, where the sector's performance reached almost $1.9 billion in 1985. In all other regions of the country, the academic sector accounted for between 10 percent and 16 percent of total R&D activity. Nationwide, academia's share of the country's R&D total was 12 percent.

nonprofit institutions

Based on available geographic nonprofit data (that is, Federal obligations to this sector),[9] the New England States—specifically Massachusetts—led all others by a large margin in terms of the nonprofit regional R&D share. The nonprofit sector accounted for 8.9 percent of New England's R&D performance compared to a 2-percent share or less in each of the other eight regions.

sectoral distribution by state

The relative importance of the various sectors differs somewhat between States with large R&D activity and those where little R&D is conducted. Generally, in terms of performance shares, academia is the most important sector in States with small overall R&D performance levels. Industry R&D, on the other hand, accounts for a relatively larger share of total in States where substantial R&D activity is undertaken by all sectors.

Chart 7 illustrates the point. The sector shares for South Dakota, the State with the smallest amount of R&D performance, are plotted on the left-hand vertical axis. About 40 percent of South Dakota's R&D is performed by the academic sector: the remainder is almost evenly split between industry and the Federal Government. Moving across the chart, larger by-State R&D performances are sequentially summed, with the plotting along the right-hand axis showing distribution shares for total U.S. R&D performance. Industry share of total is 74 percent; the Federal Government and academia account for 11 percent and 12 percent, respectively; and the nonprofit sector for 2 percent.[10]

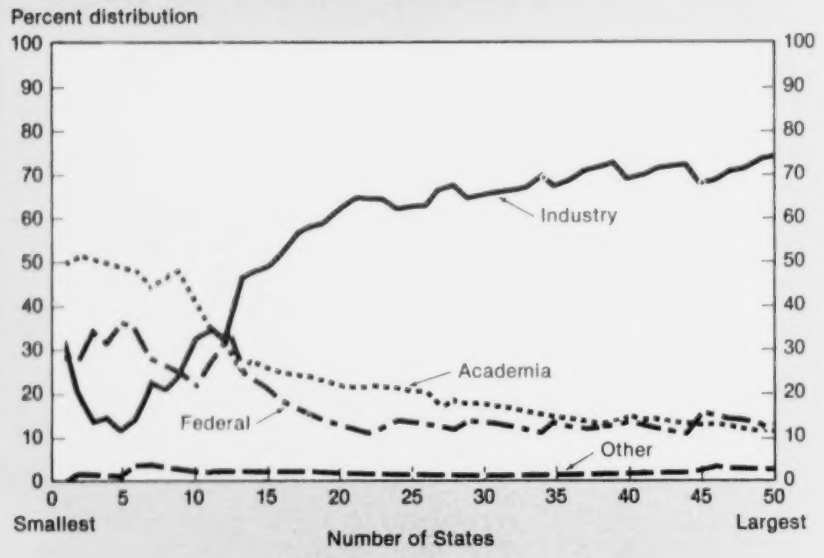
Although relative sector shares fluctuate somewhat, within the smaller States' R&D performance subtotals, academia is by far the most important sector, followed by Federal intramural performers, and then the industrial sector.[11] (The nonprofit sector generally accounts for between 1 percent and 3 percent of all R&D performance subtotals.) Only after the smallest 12 States are summed does industry's share of the

[9] See appendix A for further details on data available for the nonprofit sector.

[10] These calculations do not include either R&D expenditures for the District of Columbia or those that could not be geographically distributed (see appendix A). While the undistributed portion is a relatively small part of the U.S. R&D total—2.8 percent—its importance varies considerably within each of the individual sectors. For example, undistributed industry funds account for most (49.6 percent, or $1.4 billion) of all undistributed funds, but equals only 1.8 percent of the $78.2 billion spent by industry in 1985. By comparison, undistributed funds accounted for 3.3 percent ($0.4 billion) of the Federal Government's, 1.4 percent of academia's ($0.2 billion), and an estimated 31.0 percent of the nonprofit sector's ($1.0 billion) R&D performance (table B-4).

[11] Universities and colleges in Hawaii accounted for 65 percent of all R&D performed in the State. In only six other States (Alaska, Arkansas, Nebraska, North Dakota, South Dakota, and Wyoming) did the academic sector account for more than 40 percent of the R&D total. Each of these seven States ranked among the 15 smallest in terms of total by-State R&D performance.

Chart 7. Distribution of cumulative R&D performance by sector: 1985



SOURCE: National Science Foundation, SRS

R&D total reach those of government and academia. Each of the three sectors account for about one-third of the R&D performed.

Thereafter, relative shares of both government and academia decrease, while that of industry increases. The summed R&D performance shares of the 25 smallest States are 64 percent for industry, 20 percent for academia, and 14 percent for the Federal Government. Adding in the R&D performance in the 25 largest States, changes in sector distribution subtotals are more subtle. Generally, industry accounts for about 70 percent of R&D performance subtotals; the Federal Government's share fluctuates in a 12-percent to 16-percent range; and academically performed R&D declines steadily from 20 percent to about 12 percent of total.

distribution of federal r&d obligations

The Federal Government provided approximately half the R&D funds spent nationwide in 1985. Although the State distribution shares of Federal R&D funds and total R&D performance do not match exactly, the two do tend to go hand-in-hand (tables 2 and B-5). States that account for a large share of the Nation's R&D performance generally receive a large share of the Federal Government's R&D support.

DOD is the primary source of Federal R&D funds in 33 States and the District of Columbia and the secondary Federal source in 7 States. It provided 63 percent of all Federal R&D funds in 1985. Industry—especially electrical equipment and aircraft and missiles firms—is the major recipient of defense-related R&D support. The academic sector, however, also has received considerable DOD funding for research in such fields as engineering and mathematics and computer sciences.

Overall, HHS is the second largest Federal funder of R&D (mostly biomedical), comprising 12 percent of the Federal total. HHS is the primary funder in 5 States and the secondary funder in 24 others. Other primary Federal R&D funding agencies are DOE (in seven States, three of which are in the Mountain region), USDA (in Montana, Nebraska, and North Dakota, States with large rural economies), and the Interior (in two States—South Dakota and mineral-rich Alaska). DOE accounted for 11 percent of the 1985 Federal total, USDA for 2 percent, and the Interior for less than 1 percent. NASA provided 7 percent of all Federal R&D funds, but was not the primary Federal source of funds in any individual State.

characteristics of regional r&d performance

The scope and scale of its R&D activity is unique to each of the nine geographic regions. For example, the performance shares of the different sectors vary extensively from one region to another (chart 8). Industry's R&D role is most pronounced in the Great Lakes; academic R&D has its largest regional share in the Mountain States (however, if academically administered FFRDCs are excluded, academia's relative R&D share is largest in the Southwest); the Federal Government's performance is greatest—both in absolute and percentage terms—in the South Atlantic region; and nonprofit R&D performance is highest in New England.

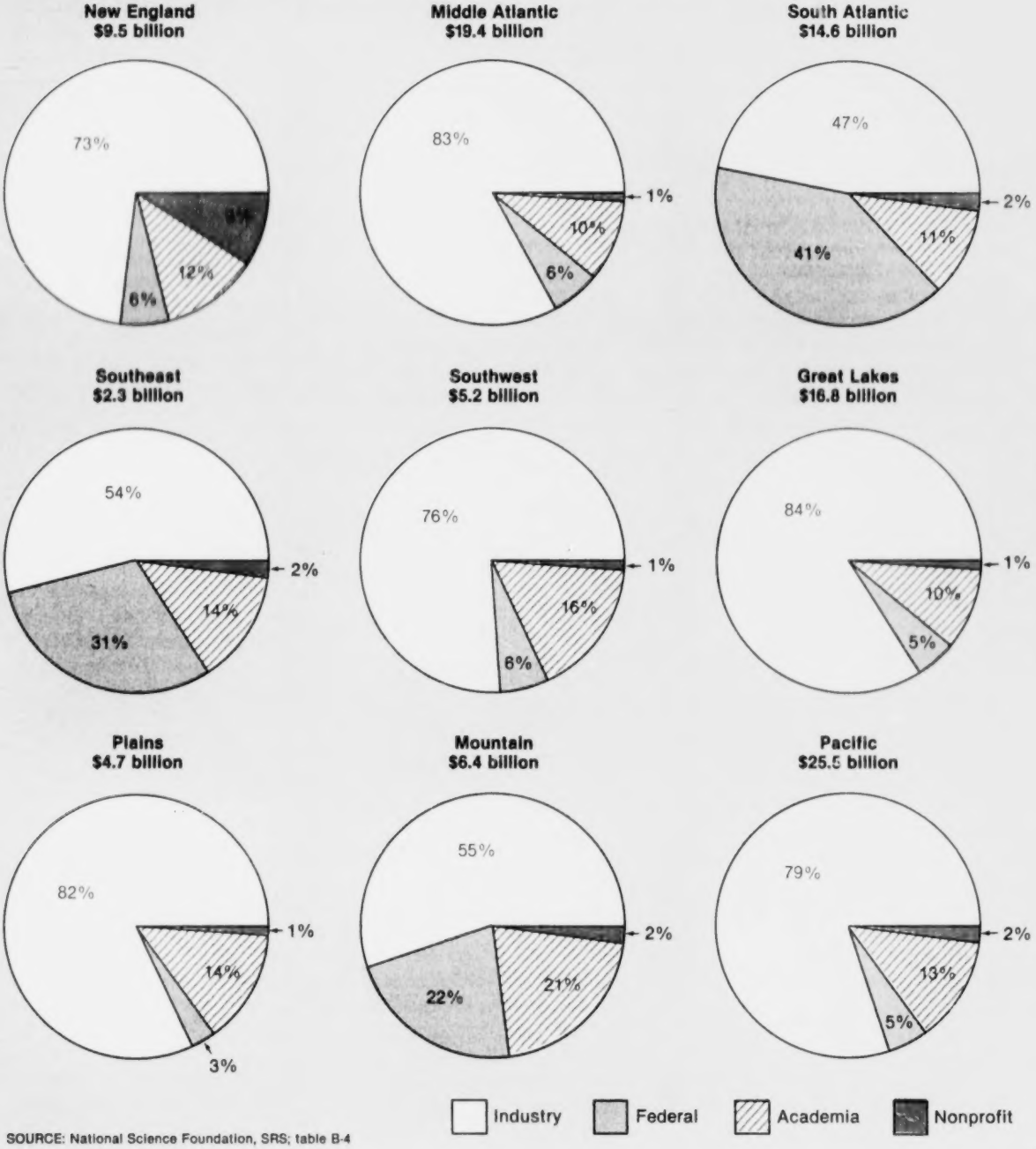
At a more disaggregated level, the differences in regional R&D performance are even more striking. For example, although industry accounts for the largest share of the R&D total in each region, the major product lines of the R&D-performing companies differ considerably among States. Academic research fields also differ by region, as does the role of various Federal agencies in terms both of funding research and conducting intramural R&D.

new england

The six New England States accounted for 8.9 percent ($9.5 billion) of the U.S. 1985 R&D total. Four regions performed more R&D; four performed less. Most (about 63 percent) of New England's R&D was undertaken in Massachusetts. This State was ranked fifth nationally in terms of total and industrial R&D, third in academic R&D, and first in Federal R&D obligations to the nonprofit sector. Connecticut accounted for 24 percent of the region's R&D total; the region's four other States performed 13 percent of total.

New England's industrial R&D performance share was about average for the Nation as a whole—72.6 percent versus 72.8 percent. The region's three top R&D-performing industries were electrical equipment (especially the communications segment in Massachusetts), computers, and aircraft and missiles (especially in Connecticut) (tables B-7 and B-8). Two-thirds of the region's industrial R&D was company-funded; one-

Chart 8. Distribution of regional R&D expenditures by performing sector: 1985



SOURCE: National Science Foundation, SRS; table B-4

third of the funds came from Federal sources (chart 9). Most of these Federal R&D dollars were spent by companies in the electrical equipment industry—many of which were small, high-tech companies established over the last decade along Massachusetts' famed Route 128 corridor.

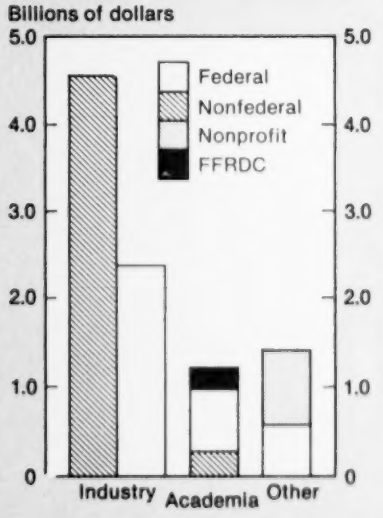
DOD was the leading Federal intramural performer in the region (table B-6): Almost half of its regional activities were undertaken in Rhode Island. DOD and HHS were the top two Federal sources of R&D funds in each of the six States (table B-5).

The academic sector performed 12 percent of New England's R&D total; the Massachusetts-based, DOD-sponsored FFRDC, Lincoln Laboratory, accounted for one-quarter of this. Most (80 percent) of the region's academic R&D funds was provided by the Federal Government. HHS provided almost half the R&D funds used by academic performers other than FFRDCs. Of the non-Federal sources of academic R&D, industry provided 28 percent of New England's total; this was more than industry's relative contribution in any other region (table B-11). State and local governments provided only 6 percent of the non-Federal total: this was the lowest nationwide.

Academic R&D was concentrated in the life sciences (35 percent) and the various engineering disciplines (29 percent) (table B-10). Only in the Pacific region did the academic sector spend more on engineering R&D than was similarly spent in New England.

Fourteen percent of Massachusetts' total R&D performance was in the nonprofit sector. (Most was undertaken in the primarily DOD-funded Draper Laboratories.) Given this large proportion, the nonprofit sector accounted for 9 percent of New England's R&D total. The Massachusetts nonprofit sector received more Federal R&D funds—of which 60 percent was from DOD and 35 percent from HHS—than did this sector in any other State.

Chart 9. R&D performance in the New England region by source of funds: 1985



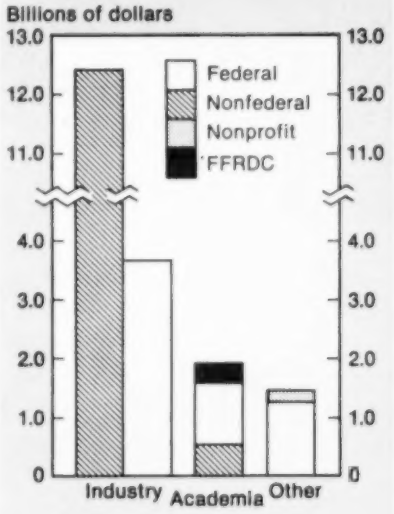
SOURCE: National Science Foundation, SRS; tables B-1 and B-9

middle atlantic

Each of the three Mid-Atlantic States was ranked among the top eight in terms of total R&D in both 1975 and 1985. New York was ranked second in both years, and New Jersey moved from fifth to third. Pennsylvania, on the other hand, dropped from fourth to eighth largely as a result of slow industrial R&D growth. Overall, the region was second only to the Pacific States in terms of total R&D performance in 1985: Eighteen percent ($19.4 billion) of the U.S. total was conducted in the Mid-Atlantic.

Industry accounted for 83 percent of the regional R&D effort. This was nearly identical to industry's leading 84-percent share in the Great Lakes. In terms of by-State industrial R&D activity, New York, New Jersey, and Pennsylvania were ranked second, fourth, and sixth, respectively, in 1985. In New York, the machinery (especially computers) and electrical equipment (especially communication) industries were largest, with each reporting R&D performance of more than $1.5 billion. The electrical equipment industry also was the largest R&D-performing industry in both New Jersey and Pennsylvania. Moreover, the chemicals (in both New York and New Jersey) and instruments (New York) industries each expended more than $1 billion on R&D. About one-third of the region's total industrial R&D funds came from Federal sources (chart 10) and were received largely by firms developing computer and communications systems for the military.

Chart 10. R&D performance in the Middle Atlantic region by source of funds: 1985



SOURCE: National Science Foundation, SRS; tables B-1 and B-9

Federal agencies performed 6 percent of the R&D undertaken in the region, and DOD accounted for 88 percent of this total. This was the highest Federal agency performance share in any of the nine regions.

Academia performed 10 percent of the Mid-Atlantic R&D total. Almost half of this was in the life sciences; 29 percent was in the physical

sciences. Federal agencies funded 72 percent of the academic R&D activities. Excluding FFRDCs, which received most of their funding from DOE, HHS provided 56 percent of the region's academic Federal R&D total. Only the Pacific region received more Federal funds for academic R&D; only the South Atlantic and Great Lakes regions received more non-Federal academic R&D funding (table B-9). New York was the 2nd largest academic performer in the Nation (14 percent of the State's R&D was performed by this sector), Pennsylvania was 8th largest, and New Jersey was 10th nationally.

great lakes

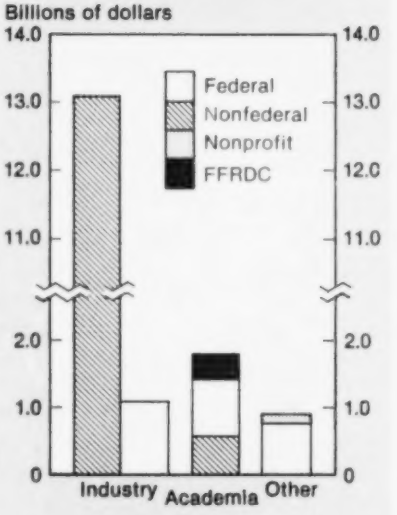
No other region saw its share of the R&D total fall as much as did the Great Lakes between 1975 and 1985. Within the five Great Lakes States, R&D performance fell from 17.0 percent to 15.6 percent ($16.8 billion) of the Nation's total during this period. While most of the relative decline resulted from slow growth in Ohio—which fell from 7th to 10th nationally—by-State R&D also fell as a percentage of the national total in Michigan (moving from 3rd to 4th), Illinois (9th each year), and Wisconsin (between 23rd and 26th in both years). R&D growth in Indiana was about even with the national growth rate—11.8 percent per year or a 5-percent annual increase in real terms. Just as these States' R&D growth rates have not differed substantially from one another, the R&D undertaken in the region also is fairly well distributed: Three States were ranked among the top 10 in 1985 and the other two also placed above the national median.

Industry accounted for a region-leading 84-percent share of total. Michigan, Illinois, and Ohio each was ranked among the top nine industrial performers in the country. In fact, the industrial sector was relatively more important in Michigan than in any other State except Delaware, accounting for 94 percent of Michigan's R&D total. Most (80 percent) of the State's R&D expenditures were provided by motor vehicle companies. Conversely, two-thirds of the R&D performed nationwide by this industry ($7.1 billion in 1985) took place in Michigan. Companies in the electrical equipment, chemicals, and rubber products industries performed more than $500 million in R&D in Ohio; the largest industrial R&D performers in Illinois were electrical equipment (especially communication) and machinery companies. Almost all—92 percent—of the region's 1985 industrial R&D performance was funded by companies. The Federal Government provided little industry R&D support (chart 11).

The academic sector accounted for 10 percent of the regional R&D total and—excluding that performed at the DOE-sponsored Argonne National Laboratory in Illinois—was distributed rather evenly among the States. Forty percent of the region's academic R&D was in the life sciences and about one-fourth was in the physical sciences. HHS provided half the Federal funds for academic R&D (excluding Argonne). Institutional sources accounted for 49 percent of academia's non-Federal funding; only 14 percent came from industry.

Federal and nonprofit performers together comprised only 5 percent of the Great Lakes' R&D total. DOD was the largest Federal R&D performer; most of its work took place in Ohio.

Chart 11. R&D performance in the Great Lakes region by source of funds: 1985



SOURCE: National Science Foundation, SRS; tables B-1 and B-9

plains

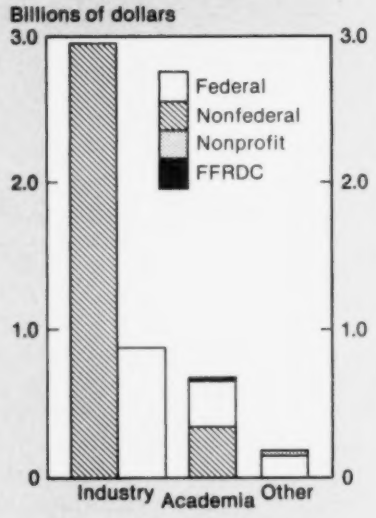
The seven Plains States collectively accounted for 4.4 percent ($4.7 billion) of the 1985 national R&D performance total. They held a 3.8-percent share in 1975. The region's largest performers, Minnesota and Missouri, ranked 15th and 19th nationally in 1985. Four of the region's States—Kansas, Nebraska, and the Dakotas—placed among the smallest third in terms of total R&D performance.

Most (82 percent) of the R&D in the Plains was performed by industry; the largest performers were computer, aircraft and missiles, and chemical companies. Companies funded 77 percent of the region's industrial R&D; the Federal Government funded the rest (chart 12).

The importance of the industrial sector to the R&D effort in the Plains States varies considerably. Companies accounted for most of the R&D undertaken in Minnesota (89 percent of total) and Missouri (85 percent), but for much less in the largely rural States of Nebraska (36 percent), South Dakota (31 percent), and North Dakota (18 percent) (table B-4).

Universities and colleges accounted for a region-leading 14-percent share and for about one-third or more of the R&D in four of the Plains States (North Dakota, Nebraska, South Dakota, and Iowa). The dollar amount of academic R&D was

Chart 12. R&D performance in the Plains region by source of funds: 1985



SOURCE: National Science Foundation, SRS; tables B-1 and B-9

quite small, however, and was concentrated in the life sciences (68 percent of the $0.7 billion academic R&D total). HHS provided 63 percent of the Federal funds for academic R&D; this explains (in part) the high concentration in the life sciences. As a share of academic total, the HHS contribution was more than in the other eight regions.

Fully half of academic R&D was funded by non-Federal sources. This made the Plains one of only two regions (the Southwest was the other) where non-Federal academic R&D funding was larger than Federal funding. Nationwide, Federal funds account for 73 percent of the academic—including university-administered FFRDCs—R&D effort (table B-9).

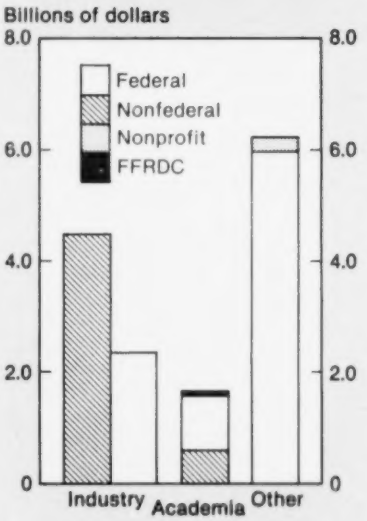
Federal intramural performance equaled only 3 percent of the region's R&D effort: USDA was responsible for half of this, which was undertaken primarily in Iowa.

south atlantic

Total R&D activities in the South Atlantic equaled $14.6 billion, or 13.6 percent of the 1985 U.S. total. This is roughly the same share of total it held in 1975. Maryland was the region's largest R&D performer; it rose from seventh to sixth in terms of total R&D during this period. The region's largest relative gains, however, were made by South Carolina which moved from about 40th in 1975 to 31st in 1985.

Nonacademic R&D in the region's eight States and the District of Columbia was rather evenly split between industry and the Federal Government (chart 13). Industry's R&D share (47 percent) was smaller in the South Atlantic than in the other eight regions, even though this sector comprised about 95 percent of Delaware's total R&D—the national high in 1985.

Chart 13. R&D performance in the South Atlantic region by source of funds: 1985



SOURCE: National Science Foundation, SRS; tables B-1 and B-9

Aircraft and missiles and chemical companies accounted for most of the industrial R&D effort, and was performed primarily in Florida (which ranked 13th in total industrial performance in 1985), Maryland (ranked 14th), and Delaware (ranked 19th). Maryland and Virginia also have a large number of telecommunications, computer software, and electronics firms performing R&D for the Government.[12] Most companies performing R&D in North Carolina (ranked about 22nd nationally) are located in the Research Triangle Park, which is the largest planned research park in the United States.

Federal intramural performance accounted for 41 percent ($6 billion) of the region's R&D total and was performed mostly by DOD, HHS, and NASA. In no other region did Federal performance or share of total reach nearly as high. Almost half the Federal Government's total intramural performance took place in the South Atlantic, especially Maryland, the District of Columbia, and Virginia. Indeed, the Federal R&D effort is the primary reason why Maryland is ranked sixth in terms of total R&D: It accounted for 60 percent ($3 billion) of the State's 1985 R&D total. A large share of this regional effort, however, included Federal R&D administrative activities in addition to laboratory research.

The academic sector accounted for 11 percent of the regional performance total and, as in many other regions, was concentrated in the life sciences. Academic research in the math and computer sciences was also well represented in this region: 14 percent of the Nation's math and computer science R&D was undertaken here—second only to the Pacific region. The Federal Government funded two-thirds of the academic R&D in the South Atlantic, of which 52 percent came from HHS. Of the

[12] National Science Foundation, *Geographic Distribution of Industrial R&D Performance*, Special Report, NSF 88-317 (Washington, D.C., 1988).

non-Federal academic R&D support, 52 percent was provided from universities' own funds, compared with a 46-percent share nationwide.

southeast

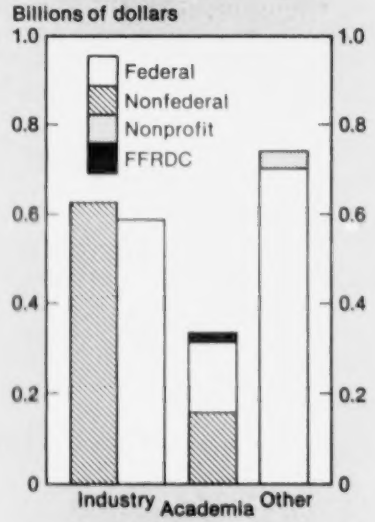
The four Southeast States accounted for the smallest share of the Nation's regional R&D total in 1985—2.1 percent, or $2.3 billion. Moreover, this was down slightly from a 2.4-percent share in 1975. Alabama, the Southeast's largest 1985 performer, ranked just 23rd nationally in terms of total R&D. Half the Southeast's R&D effort was performed by industry, one-third by the Federal Government, and the rest by academia and other nonprofit institutions.

The Southeast region performed less than 2 percent of the Nation's industrial R&D total. Tennessee accounted for the largest industrial R&D performance, but was ranked only 24th nationally in this sector. The largest R&D-performing industry in both Tennessee and Alabama was aircraft and missiles. In Alabama, much of the industry R&D has been related to the Strategic Defense Initiative. Not surprisingly, given industry's defense focus, the Federal Government provided 51 percent of the funds used in the region's industrial R&D activities (chart 14). The Federal share of industry's R&D regional effort was second largest in the Nation after the Pacific region, where Federal funds accounted for 60 percent of the industrial total.

DOD and NASA were the largest Federal intramural performers in the Southeast (63 percent and 25 percent of the 1985 sector total, respectively). Most of NASA's regional R&D activities were performed in Alabama, and DOD accounted for one-third of all R&D performed in Mississippi.

Only 54 percent of the R&D performed in the Southeast's universities and colleges was federally funded—compared with 73 percent nationally; the remaining 46 percent came from non-Federal sources. HHS and USDA were the largest Federal funding agencies; State and local governments provided the largest share (37 percent) of the non-Federal total (table B-11). Of the academic R&D total, 75 percent went to the life sciences in 1985.

Chart 14. R&D performance in the Southeast region by source of funds: 1985



SOURCE: National Science Foundation, SRS; tables B-1 and B-9

southwest

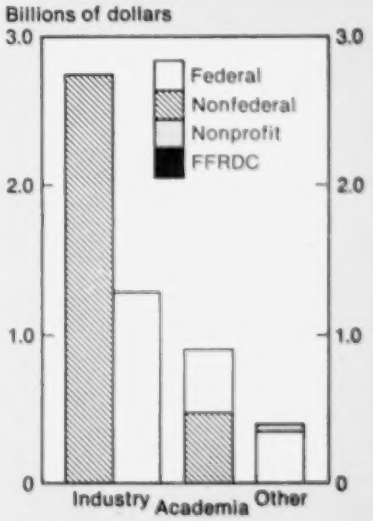
During the 1975–85 decade, the four Southwest States increased from a 3.9-percent share of U.S. R&D funding to 4.9 percent ($5.2 billion). All of this increase is due to R&D growth in Texas, which moved from 10th to 7th in terms of total R&D performance, and—in 1985—accounted for 84 percent of all R&D undertaken in the region.

Industry accounted for 76 percent of the region's R&D total, two-thirds of which was funded out of companies' own funds (chart 15). Most (87 percent) of the Southwest's industrial R&D was undertaken in Texas. Leading the State's industrial performers were petroleum refining, primary metals, electrical equipment, and aircraft and missiles companies. Each reported R&D efforts of between $500 million and $900 million in 1985. Petroleum refining companies were also among the largest industrial R&D performers in Oklahoma and Louisiana.

The Federal Government accounted for 12 percent of the region's R&D total. The largest Federal performer—half of total—was NASA's work in Texas.

Academia performed 16 percent of the region's R&D. Although the sector's R&D performance in Texas far outdistanced that of its neighboring States in dollar terms, academia was most important in

Chart 15. R&D performance in the Southwest region by source of funds: 1985



SOURCE: National Science Foundation, SRS; tables B-1 and B-9

Arkansas and Louisiana as a share of State total. About 40 percent of all R&D in these two States was performed by universities and colleges.

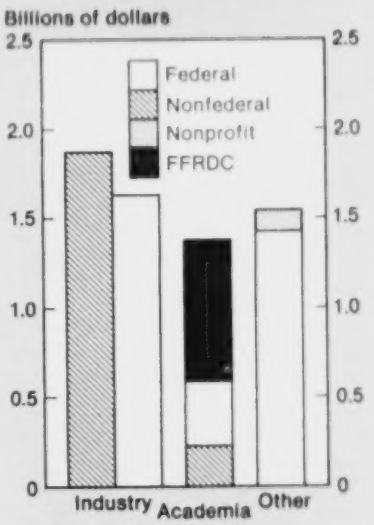
The Southwest is the only region in which non-Federal sources accounted for a larger share of the academic R&D total than did Federal sources—53 percent versus 47 percent. It is also the only region in which there was no academically administered FFRDC R&D activity. The universities themselves and State and local governments were the source of most non-Federal funds (43 percent and 25 percent of total); HHS provided 58 percent of the Federal funding to academic R&D.

mountain

The eight Mountain States accounted for 5.9 percent ($6.4 billion) of the national R&D total in 1985. This was about 30 percent greater than its 1975 share, making R&D growth in the Mountain region greater than in any other region during this 10-year period. Growth was most rapid in Idaho, New Mexico, Arizona, and Colorado.

The academic sector accounted for one-fifth of the regional R&D activity, a figure which led the Nation in terms of this sector's share of regional performance levels. Over half (57 percent) the region's academic total was R&D performed in university-administered FFRDCs (chart 16) located in New Mexico, Arizona, and Colorado. DOE sponsored 82 percent of this research; New Mexico's Los Alamos Scientific Laboratory performed 90 percent of the region's academic FFRDC R&D total (table B-10). Over one-quarter of the academic R&D effort was provided separately to universities and colleges by Federal agencies. Non-Federal sources funded only 17 percent of the academic effort. Industry provided 21 percent of the non-Federal total—the second largest share in the Nation. R&D in the physical sciences accounted for 33 percent of the academic total, engineering for 25 percent, and the life sciences for 21 percent.

Chart 16. R&D performance in the Mountain region by source of funds: 1985



SOURCE: National Science Foundation, SRS; tables B-1 and B-9

Industry accounted for 55 percent of the regionally performed R&D; industry's share of the R&D total was smaller only in the Southeast and South Atlantic regions. Machinery companies in Arizona and Colorado and electrical equipment companies in New Mexico were the largest industry performers in the Mountain States.

Federal intramural performance was 22 percent of the region's R&D total—this was second only to its 41-percent share of total in the South Atlantic region. DOD activities predominated in the Mountain States, representing 85 percent of this sector's total, and occurring primarily in New Mexico.

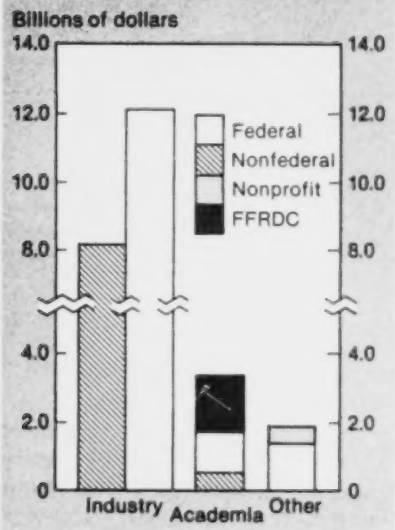
pacific

As a result of the R&D undertaken in California, the Pacific region led all others in terms of total, industrial, and academic R&D expenditures. The region accounted for 23.7 percent ($25.5 billion) of the R&D performed nationwide, and California accounted for 87 percent of the regional effort (20.7 percent of the U.S. total). In 1975, the Pacific region accounted for 21.1 percent of the national R&D total, and California alone for 18.6 percent. Washington's share of the Nation's R&D total also grew from 1.8 percent to 2.4 percent between 1975 and 1985.

Industry performed almost 80 percent of the Pacific States' R&D; DOD was the most important source of revenues for such activities. By far, most of the region's R&D was performed by California's aircraft and missiles industry. It accounted for 56 percent ($10 billion) of the State's industrial R&D expenditures. Aircraft and missiles firms were also the largest R&D performers in Washington and Hawaii.[13] The electrical equipment industry ($1.9 billion), especially including electronic components, was the second largest industrial R&D performer in California. Many of these high R&D-performing companies are located in San Francisco's Silicon Valley. Primarily because of the defense-related nature of the aircraft and missiles and electrical equipment industries, 60 percent of the region's industrial R&D total was funded by the Federal Government (chart 17).

[13] The aircraft and missiles industry is historically the largest performer of industrial R&D nationwide. For a full discussion of R&D expenditures by type of industry, see National Science Foundation, *Science and Technology Resources in American Industry*, NSF 88-321 (Washington D.C., in press).

Chart 17. R&D performance in the Pacific region by source of funds: 1985



SOURCE: National Science Foundation, SRS; tables B-1 and B-9

The Pacific was the only region in which Federal funds to industry exceeded that of industry's own funding. Although California is the leading recipient ($10 billion) of Federal funds for industrial R&D performance ($27 billion provided nationwide), industries in Washington and Hawaii also had more Federal than companies' own R&D expenditures in 1985.

Academia performed 13 percent ($3.36 billion) of the Pacific region's R&D. Most of this ($1.73 billion) was performed by four California FFRDCs which were funded primarily by DOE and NASA. Federally funded non-FFRDC performance accounted for another 34 percent ($1.15 billion) of academia's total—of which 46 percent came from HHS and 18 percent from DOD. Of the region's non-Federal academic R&D funds (only 15 percent of sector total), industry provided just 7 percent. Its percentage contribution was lowest of the nine regions. In dollar terms, industry's academic R&D funding of Pacific universities and colleges was only slightly more than for Southeast and Plains institutions.

In terms of the region's total academic R&D performance, the five Pacific States accounted for one-third or more of the national effort in the math and computer sciences, engineering, and the environmental sciences. No other region's academic R&D performance levels were nearly as high. Academia accounted for one-quarter or better of the R&D performed in Hawaii, Alaska, and Oregon.

Although in dollar terms, Federal intramural R&D performance was higher only in the South Atlantic and Mountain regions, it accounted for just 5 percent of the Pacific region's total R&D effort. Of the Federal regional performance, DOD activities in California accounted for 73 percent. In the other four Pacific States, but primarily Washington, Federal spending by all agencies—especially NASA—accounted for the rest.

appendixes

a. technical notes

b. detailed statistical tables

c. state personnel and funding profiles

appendix a

technical notes

industry

The National Science Foundation (NSF) sponsors an annual survey of industrial research and development (R&D) which has been conducted by the U.S. Bureau of the Census for about 30 years. A sample of approximately 13,000 companies was drawn in 1981; estimates of total 1985 industrial R&D expenditures were derived from this sample. About 1,800 companies in the sample—those firms with R&D expenditures exceeding $1 million—received a survey form each year between 1981 and 1986. Data for the remaining companies are estimated until the next sample is drawn.[1] According to the survey instructions, industry reporting is limited to R&D in the physical sciences, including related engineering, and the biological sciences, which includes medicine but not psychology. Market research activities are specifically excluded from the R&D survey definition.

In odd-numbered years, survey respondents are asked to report the dollar amounts of R&D performed within each State that the company has R&D laboratories or facilities. Up to 10 percent of a company's R&D total may be reported as "not distributed by State." Because of this provision, in 1985—the most recent year for which these data are available—$1.4 billion (1.8 percent) of industry's national $78.2 billion total was not broken out by State. In this report, such funds also are left undistributed rather than allocated to individual States.

Another difficulty is that, to avoid disclosing individual company operations, the Census Bureau suppresses certain data on industrial R&D expenditures which it collects for NSF. In 1985, data were withheld for nine States and the District of Columbia.[2] The suppressed amount equaled $2.2 billion, or 2.8 percent of the Nation's industrial R&D performance in that year.

Although it withholds data for some individual States, the Census Bureau includes performance estimates of companies located in such States in the appropriate regional totals. For example, 1985 industrial R&D performance was estimated at $6.92 billion in the six New England States. Specific amounts equaling $6.64 billion were reported separately for Connecticut, New Hampshire, Massachusetts, and Rhode Island; this left the remaining $281 million to be jointly accounted for by the region's other two States (Maine and Vermont).

This report provides ranges within which the Census-reported industrial performance data fall. The high and low ends of the State ranges were obtained from information recently made available in an NSF industry report.[3] While the industry report does not disclose information suppressed by the Census Bureau, it does provide by-State details on total industrial R&D (see appendix table 1 of that report), company-funded R&D (appendix table 3), and the rank

[1] National Science Foundation, *Research and Development in Industry: 1984*, Detailed Statistical Tables (Washington, D.C., 1985).

[2] In four of these States, the Census Bureau released information on company-funded R&D even though the total and federally funded amounts were withheld. This information is used to provide lower bounds on industrial R&D performance ranges.

[3] National Science Foundation, *Geographic Distribution of Industrial Research and Development*, Special Report, NSF 88-317 (Washington, D.C., 1988).

of the 20 States with the largest industrial R&D expenditures (table 2). The industry report also contains a chart which groups each State by one of five industrial performance categories:

- more than $2 billion,
- between $1 billion and $2 billion,
- between $0.5 billion and $1 billion,
- between $75–$500 million, and
- less than $75 million.

These data are used to derive the industrial performance ranges in the present report.

federal government

Geographic data for Federal intramural R&D performance are budget obligations as reported by the 10 major R&D-supporting agencies.[4] Obligations in this report are for the fiscal year (FY) ending September 30, 1985. These amounts are for orders placed, contracts awarded, services received, and similar transactions during FY 1985 regardless of when funds were appropriated and when future payment of money is required. Consequently, obligation data differ from outlays since these latter represent the amounts for checks issued and cash payments made during a given period, regardless of when the funds were appropriated. Intramural government R&D activities cover costs associated with the planning and administration of intramural and extramural R&D programs by Federal personnel as well as actual intramural R&D performance.

In FY 1985, $426 million—or 3 percent of the reported $12.9 billion intramural total—could not be distributed among the individual States. This R&D was performed by agencies other than the top 10, for which detailed State data are reported.

academia

This sector consists of all institutions of higher education, both public and private, as well as those federally funded research and development centers (FFRDCs) administered by universities and colleges or their consortia. Regional R&D performance totals are available for all universities and colleges combined ($9.52 billion in FY 1985); however, State-specific R&D expenditures data are available only for institutions that grant doctorates in science and engineering ($9.38 billion, or 98.5 percent of the universities' and colleges' FY 1985 total). The difference between these two figures was left undistributed throughout this report: No attempt was made to allocate such R&D to the individual States. Because of the small dollar amounts involved, the omission from any one State's performance total should be minimal.

University-administered FFRDCs performed $3.53 billion worth of R&D in 1985. The amounts were assigned to the States where the FFRDCs are located (that is, where the R&D is performed). These are not necessarily the same States in which the administering institutions have their campuses.

nonprofit sector

NSF does not collect geographic R&D performance data for nonprofit institutions outside the academic sector. Therefore, to proxy the performance of these institutions, this report uses FY 1985 Federal R&D obligations, by State, to nonprofit institutions and FFRDCs administered by nonprofit institutions. Consequently, the State and regional data for this sector are reported by source rather than by performer, exclude all non-Federal sources of funds, and result in a large undistributed component.

In FY 1985, the nonprofit sector's total R&D performance was an estimated $3.3 billion,[5] of which Federal obligations accounted for $2.2 billion. This leaves approximately $1.1 billion of this sector's R&D performance not distributed by State.

In general, zero figures indicated for individual States represent FY 1985 Federal R&D obligations of less than $0.5 million. Only in South Dakota were there no reported Federal R&D obligations to nonprofit institutions.

r&d performance in 1975

Table B-12 in this report contains 1975 R&D performance data and 1975–85 growth rates for the United States, each of the 9 regions, and 37 States. These data generally were compiled in the same way as detailed above for 1985:

- Industry performance is based on the NSF/Census company reported survey.
- Federal performance is FY 1975 obligations.
- Academic performance is for all universities and colleges, not just doctorate-granting institutions, and includes FFRDCs.
- Nonprofit performance is FY 1975 obligations to nonprofit organizations and associated FFRDCs.

Total R&D performance data for 13 States and the District of Columbia are not reported in table B-12. This is because the industrial R&D component is unavailable for either 1975 or 1985.

[4] National Science Foundation, *Federal Funds for Research and Development, Fiscal Years 1985, 1986, and 1987*, Volume XXXV, Detailed Statistical Tables (Washington, D.C., 1985).

[5] National Science Foundation, *National Patterns of R&D Resources: 1989*, Final Report, NSF 89-308 (Washington, D.C., 1989).

appendix b

detailed statistical tables

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Table B-1. Geographic distribution of R&D performance by sector: 1985

(Dollars in millions)

Region and State	Total	Industry	Federal Govt.	Univers. and colleges	Other nonprofit 1/
United States	$107,456	$78,208	$12,945	$13,053	$3,250
Northeast	$28,979	$23,058	$1,806	$3,061	$1,055
New England	9,538	6,922	586	1,179	851
Connecticut	2,310	1,976	139	189	6
Maine 2/	58-109	23-74	3	21	11
Massachusetts	6,022	4,173	178	848	823
New Hampshire	368	294	36	38	0
Rhode Island	493	198	227	57	11
Vermont 2/	237-288	207-258	2	28	0
Middle Atlantic	19,441	16,136	1,219	1,882	204
New Jersey	6,722	5,547	894	273	8
New York	8,371	7,019	87	1,148	117
Pennsylvania	4,348	3,570	238	460	79
South	$22,105	$12,020	$7,020	$2,707	$358
South Atlantic	14,616	6,812	5,989	1,556	259
Delaware 2/	828-945	800-917	3	24	1
D.C. 2/	1,685-1,759	0-74	1,532	64	89
Florida	2,404	1,832	362	203	6
Georgia	831	515	86	226	4
Maryland	4,951	1,437	2,952	530	32
North Carolina	1,193	797	137	245	14
South Carolina	476	389	20	66	1
Virginia	1,947	800	868	168	112
West Virginia 2/	153-301	94-242	30	29	0
Southeast	2,258	1,209	701	309	39
Alabama	973	387	462	104	20
Kentucky	306	221	31	54	0
Mississippi	245	62	122	53	7
Tennessee	734	538	86	98	11
Southwest	5,230	3,998	330	843	60
Arkansas	68	15	22	30	1
Louisiana	348	187	34	126	2
Oklahoma	443	304	26	96	17
Texas	4,372	3,492	249	591	40
North Central	$21,478	$18,001	$908	$2,382	$187
Great Lakes	16,798	14,161	771	1,730	135
Illinois	4,154	3,231	86	768	69
Indiana	1,643	1,433	49	159	2
Michigan	6,370	5,975	76	301	18
Ohio	3,688	2,847	535	262	43
Wisconsin	944	676	25	240	3
Plains	4,680	3,840	136	652	51
Iowa	488	317	20	151	0
Kansas	359	285	8	66	1
Minnesota	2,211	1,971	31	173	36
Missouri	1,424	1,208	42	161	13
Nebraska	116	42	12	61	1
North Dakota	57	10	16	31	0
South Dakota	23	7	7	9	0
West	$31,874	$23,738	$2,785	$4,722	$628
Mountain	6,387	3,496	1,425	1,359	107
Arizona	1,269	1,002	102	163	1
Colorado	1,309	917	108	208	76
Idaho	454	419	13	21	1
Montana 2/	43-117	0-74	19	24	0
Nevada 2/	127-173	28-74	80	19	0
New Mexico 2/	2,545-2,654	690-799	1,024	806	25
Utah	491	317	72	101	2
Wyoming	27	3	7	16	1
Pacific	25,487	20,242	1,360	3,364	521
Alaska 2/	59-73	0-14	30	29	0
California	22,293	17,760	1,177	2,957	398
Hawaii 2/	76-90	0-14	18	54	4
Oregon	450	285	35	114	16
Washington	2,596	2,183	100	210	103
Undistributed	$3,019	$1,391	$426	$180	$1,022

1/ For the nonprofit sector, funds distributed by State include only Federal obligations to organizations in this sector. Nonprofit R&D performance using non-Federal funds are undistributed. Zero figures represent Federal obligations of less than $0.5 million

2/ For the industry sector, reported data fall within the range specified but have been withheld by the Census Bureau to avoid disclosing individual company operations. Range for state total is R&D performance of Federal Government, universities and colleges, and other nonprofit institutions, plus the low and high ends of the industry R&D performance range.

SOURCE: National Science Foundation, SRS. See appendix a, Technical Notes.

Table B-2. States leading in R&D performance by sector: 1985

Total R&D ($ millions)	Rank	All sectors	Industry	Federal Government	Academia	Other nonprofits 1/
$22,293	1	California	California	Maryland	California	Massachusetts
8,371	2	New York	New York	D.C.	New York	California
6,722	3	New Jersey	Michigan	California	Massachusetts	New York
6,370	4	Michigan	New Jersey	New Mexico	New Mexico	Virginia
6,022	5	Massachusetts	Massachusetts	New Jersey	Illinois	Washington
4,951	6	Maryland	Pennsylvania	Virginia	Texas	D.C.
4,372	7	Texas	Texas	Ohio	Maryland	Pennsylvania
4,348	8	Pennsylvania	Illinois	Alabama	Pennsylvania	Colorado
4,154	9	Illinois	Ohio	Florida	Michigan	Illinois
3,688	10	Ohio	Washington	Texas	New Jersey	Ohio
2,545-2,654	11	New Mexico	Connecticut	Pennsylvania	Ohio	Texas
2,596	12	Washington	Minnesota	Rhode Island	North Carolina	Minnesota
2,404	13	Florida	Florida	Massachusetts	Wisconsin	Maryland
2,310	14	Connecticut	Maryland	Connecticut	Georgia	New Mexico
2,211	15	Minnesota	Indiana	North Carolina	Washington	Alabama
1,947	16	Virginia	Missouri	Mississippi	Colorado	Michigan
1,685-1,759	17	D.C.	Arizona	Colorado	Florida	Oklahoma
1,643	18	Indiana	Colorado	Arizona	Connecticut	Oregon
1,424	19	Missouri	Delaware	Washington	Minnesota	North Carolina
1,309	20	Colorado	Virginia	New York	Virginia	Missouri
1,269	21	Arizona	New Mexico	Tennessee	Arizona	Tennessee
1,193	22	North Carolina	North Carolina	Illinois	Missouri	Rhode Island
973	23	Alabama	Wisconsin	Georgia	Indiana	Maine
944	24	Wisconsin	Tennessee	Nevada	Iowa	New Jersey
828-945	25	Delaware	Georgia	Michigan	Louisiana	Mississippi
831	26	Georgia	Idaho	Utah	Oregon	Florida
734	27	Tennessee	South Carolina	Indiana	Alabama	Connecticut
493	28	Rhode Island	Alabama	Missouri	Utah	Georgia
491	29	Utah	Iowa	New Hampshire	Tennessee	Hawaii
488	30	Iowa	Utah	Oregon	Oklahoma	Wisconsin
476	31	South Carolina	Oklahoma	Louisiana	South Carolina	Indiana
454	32	Idaho	New Hampshire	Minnesota	Kansas	Louisiana
450	33	Oregon	Kansas	Kentucky	D.C.	Utah
443	34	Oklahoma	Oregon	West Virginia	Nebraska	Arizona
Smallest performers (alphabetically)		Alaska	Alaska	Alaska	Alaska	Alaska
		Arkansas	Arkansas	Arkansas	Arkansas	Arkansas
		Hawaii	D.C.	Delaware	Delaware	Delaware
< 400	35-51	Kansas	Hawaii	Hawaii	Hawaii	Idaho
		Kentucky	Kentucky	Idaho	Idaho	Iowa
		Louisiana	Louisiana	Iowa	Kentucky	Kansas
		Maine	Maine	Kansas	Maine	Kentucky
		Mississippi	Mississippi	Maine	Mississippi	Montana
		Montana	Montana	Montana	Montana	Nebraska
		Nebraska	Nebraska	Nebraska	Nevada	Nevada
		Nevada	Nevada	North Dakota	New Hampshire	New Hampshire
		New Hampshire	North Dakota	Oklahoma	North Dakota	North Dakota
		North Dakota	Rhode Island	South Carolina	Rhode Island	South Carolina
		South Dakota	South Dakota	South Dakota	South Dakota	South Dakota
		Vermont	Vermont	Vermont	Vermont	Vermont
		West Virginia	West Virginia	Wisconsin	West Virginia	West Virginia
		Wyoming	Wyoming	Wyoming	Wyoming	Wyoming

1/ Rankings based on Federal R&D obligations to nonprofit institutions.

SOURCE: National Science Foundation, SRS

Table B-3. Ratio of R&D performance to gross state product by State ranking: 1985

RANK R&D/GSP	RANK R&D		[Dollars in millions] R&D	GSP	R&D/GSP
1	11	New Mexico	$2,545-$2,654	$23,887	10.9%*
2	25	Delaware	828-945	10,966	8.1%*
3	6	Maryland	4,951	70,580	7.0%
4	17	D.C.	1,685-1,759	27,185	7.0%*
5	5	Massachusetts	6,022	106,148	5.7%
6	3	New Jersey	6,722	142,302	4.7%
7	1	California	22,293	496,850	4.5%
8	4	Michigan	6,370	143,719	4.4%
9	12	Washington	2,596	71,756	3.6%
10	14	Connecticut	2,310	64,696	3.6%
11	28	Rhode Island	493	13,961	3.5%
12	32	Idaho	454	13,027	3.5%
13	**	Vermont	237-288	7,915	3.3%*
14	15	Minnesota	2,211	71,183	3.1%
----------		United States	107,456	3,963,346	2.7%
15	20	Arizona	1,269	48,589	2.6%
16	8	Pennsylvania	4,348	172,990	2.5%
17	2	New York	8,371	336,071	2.5%
18	20	Colorado	1,309	56,713	2.3%
19	35	New Hampshire	368	16,585	2.2%
20	10	Ohio	3,688	167,645	2.2%
21	29	Utah	491	23,172	2.1%
22	9	Illinois	4,154	198,138	2.1%
23	18	Indiana	1,643	80,262	2.0%
24	16	Virginia	1,947	95,369	2.0%
25	23	Alabama	973	51,919	1.9%
26	19	Missouri	1,424	79,220	1.8%
		---------- Median Ratio Value ----------			
27	13	Florida	2,404	164,340	1.5%
28	7	Texas	4,372	307,615	1.4%
29	24	Wisconsin	944	72,716	1.3%
30	22	North Carolina	1,193	93,821	1.3%
31	30	Iowa	488	42,100	1.2%
32	33	Oregon	450	38,922	1.2%
33	31	South Carolina	476	41,832	1.1%
34	27	Tennessee	734	67,560	1.1%
		---------- R&D/GSP Ratio of < 1 Percent --------			
35	**	Alaska	59-73	21,237	
|	**	Arkansas	68	29,926	
|	26	Georgia	831	94,121	
|	**	Hawaii	76-90	17,994	
|	36	Kansas	359	40,364	
|	**	Kentucky	306	51,234	
|	**	Louisiana	348	79,719	
|	**	Maine	58-109	15,896	
|	**	Mississippi	245	30,819	
|	**	Montana	43-117	11,543	
|	**	Nebraska	116	25,639	
|	**	Nevada	127-173	17,918	
|	**	North Dakota	57	10,725	
|	34	Oklahoma	443	50,842	
|	**	South Dakota	23	9,297	
|	**	West Virginia	153-301	23,541	
51	**	Wyoming	27	12,777	

* Midpoint of estimated range for R&D/GSP ratio.
** Among the smallest 15 States in terms of total R&D performance.

SOURCES: National Science Foundation, SRS, and Department of Commerce

Table B-4. Percent distribution of R&D performance by State and sector: 1985

Region and State	Percent of total State performance					Percent of total sector performance				
	Total	Industry	Federal	U&Cs	Nonprofits	Total	Industry	Federal	U&Cs	Nonprofits
United States	100.0%	72.8%	12.0%	12.1%	3.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Northeast	100.0	79.6	6.2	10.6	3.6	27.0	29.5	13.9	23.5	32.5
New England	100.0	72.6	6.1	12.4	8.9	8.9	8.9	4.5	9.0	26.2
Connecticut	100.0	85.6	6.0	8.2	0.2	2.1	2.5	1.1	1.4	0.2
Maine 1/	100.0	58.5	3.6	24.9	13.0	0.1	0.1	0.0	0.2	0.3
Massachusetts	100.0	69.3	3.0	14.1	13.7	5.6	5.3	1.4	6.5	25.3
New Hampshire	100.0	79.9	9.7	10.3	0.0	0.3	0.4	0.3	0.3	0.0
Rhode Island	100.0	40.1	46.1	11.5	2.3	0.5	0.3	1.8	0.4	0.3
Vermont 1/	100.0	88.5	1.0	10.5	0.1	0.2	0.3	0.0	0.2	0.0
Middle Atlantic	100.0	83.0	6.3	9.7	1.0	18.1	20.6	9.4	14.4	6.3
New Jersey	100.0	82.5	13.3	4.1	0.1	6.3	7.1	6.9	2.1	0.3
New York	100.0	83.8	1.0	13.7	1.4	7.8	9.0	0.7	8.8	3.6
Pennsylvania	100.0	82.1	5.5	10.6	1.8	4.0	4.6	1.8	3.5	2.4
North Central	100.0	83.8	4.2	11.1	0.9	20.0	23.0	7.0	18.2	5.7
Great Lakes	100.0	84.3	4.6	10.3	0.8	15.6	18.1	6.0	13.3	4.2
Illinois	100.0	77.8	2.1	18.5	1.7	3.9	4.1	0.7	5.9	2.1
Indiana	100.0	87.2	3.0	9.7	0.1	1.5	1.8	0.4	1.2	0.1
Michigan	100.0	93.8	1.2	4.7	0.3	5.9	7.6	0.6	2.3	0.5
Ohio	100.0	77.2	14.5	7.1	1.2	3.4	3.6	4.1	2.0	1.3
Wisconsin	100.0	71.6	2.7	25.4	0.3	0.9	0.9	0.2	1.8	0.1
Plains	100.0	82.1	2.9	13.9	1.1	4.4	4.9	1.1	5.0	1.6
Iowa	100.0	64.9	4.1	31.0	0.1	0.5	0.4	0.2	1.2	0.0
Kansas	100.0	79.3	2.2	18.3	0.2	0.3	0.4	0.1	0.5	0.0
Minnesota	100.0	89.1	1.4	7.8	1.6	2.1	2.5	0.2	1.3	1.1
Missouri	100.0	84.8	3.0	11.3	0.9	1.3	1.5	0.3	1.2	0.4
Nebraska	100.0	36.2	10.7	52.2	0.9	0.1	0.1	0.1	0.5	0.0
North Dakota	100.0	17.5	28.6	53.4	0.6	0.1	0.0	0.1	0.2	0.0
South Dakota	100.0	30.7	28.9	40.3	0.0	0.0	0.0	0.1	0.1	0.0
South	100.0	54.4	31.8	12.2	1.6	20.6	15.4	54.2	20.7	11.0
South Atlantic	100.0	46.6	41.0	10.6	1.8	13.6	8.7	46.3	11.9	8.0
Delaware 1/	100.0	96.9	0.3	2.7	0.1	0.8	1.1	0.0	0.2	0.0
D.C. 1/	100.0	2.1	89.0	3.7	5.2	1.6	0.0	11.8	0.5	2.7
Florida	100.0	76.2	15.1	8.5	0.3	2.2	2.3	2.8	1.6	0.2
Georgia	100.0	62.0	10.3	27.2	0.5	0.8	0.7	0.7	1.7	0.1
Maryland	100.0	29.0	59.6	10.7	0.6	4.6	1.8	22.8	4.1	1.0
North Carolina	100.0	66.8	11.5	20.5	1.2	1.1	1.0	1.1	1.9	0.4
South Carolina	100.0	81.7	4.2	14.0	0.2	0.4	0.5	0.2	0.5	0.0
Virginia	100.0	41.1	44.6	8.6	5.7	1.8	1.0	6.7	1.3	3.4
West Virginia 1/	100.0	73.8	13.2	12.9	0.1	0.2	0.2	0.2	0.2	0.0
Southeast	100.0	53.5	31.1	13.7	1.7	2.1	1.5	5.4	2.4	1.2
Alabama	100.0	39.8	47.4	10.7	2.1	0.9	0.5	3.6	0.8	0.6
Kentucky	100.0	72.3	10.1	17.6	0.0	0.3	0.3	0.2	0.4	0.0
Mississippi	100.0	25.4	50.1	21.5	3.1	0.2	0.1	0.9	0.4	0.2
Tennessee	100.0	73.3	11.8	13.4	1.5	0.7	0.7	0.7	0.8	0.3
Southwest	100.0	76.4	6.3	16.1	1.1	4.9	5.1	2.5	6.5	1.8
Arkansas	100.0	22.2	32.1	44.4	1.2	0.1	0.0	0.2	0.2	0.0
Louisiana	100.0	53.7	9.6	36.1	0.6	0.3	0.2	0.3	1.0	0.1
Oklahoma	100.0	68.7	5.9	21.6	3.9	0.4	0.4	0.2	0.7	0.5
Texas	100.0	79.9	5.7	13.5	0.9	4.1	4.5	1.9	4.5	1.2
West	100.0	74.5	8.7	14.8	2.0	29.7	30.4	21.5	36.2	19.3
Mountain	100.0	54.7	22.3	21.3	1.7	5.9	4.5	11.0	10.4	3.3
Arizona	100.0	79.0	8.1	12.8	0.1	1.2	1.3	0.8	1.2	0.0
Colorado	100.0	70.0	8.2	15.9	5.8	1.2	1.2	0.8	1.6	2.4
Idaho	100.0	92.4	2.8	4.6	0.2	0.4	0.5	0.1	0.2	0.0
Montana 1/	100.0	45.9	23.6	30.2	0.4	0.1	0.0	0.1	0.2	0.0
Nevada 1/	100.0	33.9	53.1	12.9	0.1	0.1	0.1	0.6	0.1	0.0
New Mexico 1/	100.0	28.6	39.4	31.0	1.0	2.4	1.0	7.9	6.2	0.8
Utah	100.0	64.5	14.6	20.5	0.4	0.5	0.4	0.6	0.8	0.1
Wyoming	100.0	11.1	27.3	59.4	2.2	0.0	0.0	0.1	0.1	0.0
Pacific	100.0	79.4	5.3	13.2	2.0	23.7	25.9	10.5	25.8	16.0
Alaska 1/	100.0	10.6	45.5	43.7	0.1	0.1	0.0	0.2	0.2	0.0
California	100.0	79.7	5.3	13.3	1.8	20.7	22.7	9.1	22.7	12.3
Hawaii 1/	100.0	8.5	21.5	65.4	4.6	0.1	0.0	0.1	0.4	0.1
Oregon	100.0	63.3	7.8	25.3	3.6	0.4	0.4	0.3	0.9	0.5
Washington	100.0	84.1	3.8	8.1	4.0	2.4	2.8	0.8	1.6	3.2
Undistributed	100.0	46.1	14.1	6.0	33.9	2.8	1.8	3.3	1.4	31.4

1/ Distribution based on midpoint of estimated ranges reported in table B-1.

SOURCE: National Science Foundation, SRS

Table B-5. Total Federal R&D obligations by region and State and funding agency: fiscal year 1985

Region and State	Percent of total R&D performance	Percent of Federal R&D obligations	Federal R&D obligations			
			Primary funding source		Secondary funding source	
Total ($ in millions)	$107,456	$47,078	Defense	63.0%	H.H.S.	11.5%
Northeast	27.0%	22.9%				
New England	8.9%	9.7%				
Connecticut	2.1%	1.6%	Defense	63.5%	HHS	15.9%
Maine	0.1%	0.1%	Defense	42.0%	HHS	26.0%
Massachusetts	5.6%	6.9%	Defense	76.0%	HHS	13.8%
New Hampshire	0.3%	0.3%	Defense	77.7%	HHS	10.8%
Rhode Island	0.5%	0.7%	Defense	85.7%	HHS	6.2%
Vermont	0.2%	0.1%	HHS	46.9%	Defense	35.5%
Middle Atlantic	18.1%	13.3%				
New Jersey	6.3%	3.8%	Defense	80.8%	Energy	6.7%
New York	7.8%	6.6%	Defense	62.7%	HHS	18.6%
Pennsylvania	4.0%	2.8%	Defense	50.3%	HHS	19.2%
North Central	20.0%	10.6%				
Great Lakes	15.6%	6.8%				
Illinois	3.9%	1.6%	Energy	38.9%	Defense	25.1%
Indiana	1.5%	0.5%	Defense	53.9%	HHS	18.1%
Michigan	5.9%	1.1%	Defense	58.1%	HHS	22.3%
Ohio	3.4%	3.2%	Defense	67.8%	HHS	8.1%
Wisconsin	0.9%	0.4%	HHS	41.5%	Agriculture	13.9%
Plains	4.4%	3.8%				
Iowa	0.5%	0.3%	Defense	32.9%	HHS	31.4%
Kansas	0.3%	0.3%	Defense	75.0%	HHS	11.5%
Minnesota	2.1%	1.5%	Defense	73.6%	HHS	13.8%
Missouri	1.3%	1.5%	Defense	79.9%	HHS	13.3%
Nebraska	0.1%	0.1%	Agriculture	44.0%	HHS	30.1%
North Dakota	0.1%	0.1%	Agriculture	59.0%	Energy	21.3%
South Dakota	0.0%	0.0%	Interior	38.5%	Agriculture	33.2%
South	20.6%	31.3%				
South Atlantic	13.6%	23.7%				
Delaware	0.8%	0.1%	Defense	58.2%	NSF	13.5%
D.C.	1.6%	4.4%	Defense	66.9%	NSF	8.3%
Florida	2.2%	2.5%	Defense	60.1%	NASA	27.7%
Georgia	0.8%	0.6%	Defense	44.3%	HHS	25.8%
Maryland	4.6%	9.4%	Defense	56.3%	HHS	27.4%
North Carolina	1.1%	1.0%	HHS	39.9%	Defense	34.2%
South Carolina	0.4%	0.3%	Energy	53.4%	HHS	13.6%
Virginia	1.8%	5.2%	Defense	79.3%	NASA	10.0%
West Virginia	0.2%	0.1%	Energy	25.8%	Agriculture	16.5%
Southeast	2.1%	3.6%				
Alabama	0.9%	1.9%	Defense	61.1%	NASA	27.7%
Kentucky	0.3%	0.1%	Defense	40.0%	HHS	31.3%
Mississippi	0.2%	0.4%	Defense	53.0%	Agriculture	19.8%
Tennessee	0.7%	1.2%	Energy	65.3%	Defense	14.8%
Southwest	4.9%	4.0%				
Arkansas	0.1%	0.1%	HHS	58.5%	Agriculture	19.4%
Louisiana	0.3%	0.2%	Defense	32.7%	HHS	30.1%
Oklahoma	0.4%	0.2%	Defense	22.9%	HHS	17.0%
Texas	4.1%	3.5%	Defense	63.5%	NASA	16.9%
West	29.7%	35.2%				
Mountain	5.9%	9.6%				
Arizona	1.2%	1.0%	Defense	76.3%	NSF	8.4%
Colorado	1.2%	1.3%	Defense	37.2%	Energy	12.9%
Idaho	0.4%	0.6%	Energy	90.7%	Agriculture	4.5%
Montana	0.1%	0.1%	Agriculture	35.9%	HHS	29.4%
Nevada	0.1%	1.0%	Energy	71.8%	Defense	23.7%
New Mexico	2.4%	5.0%	Defense	55.8%	Energy	42.5%
Utah	0.5%	0.5%	Defense	66.7%	HHS	14.2%
Wyoming	0.0%	0.1%	Energy	42.2%	Interior	25.0%
Pacific	23.7%	25.6%				
Alaska	0.1%	0.1%	Interior	29.1%	Defense	25.8%
California	20.7%	22.9%	Defense	71.6%	Energy	10.0%
Hawaii	0.1%	0.1%	Defense	24.1%	HHS	16.6%
Oregon	0.4%	0.3%	HHS	27.4%	Defense	19.3%
Washington	2.4%	2.2%	Defense	55.9%	Energy	20.0%

SOURCE: National Science Foundation, SRS

Table B-6. Federal agencies' obligations for intramural R&D performance by region: fiscal year 1985

[Dollars in millions]

Federal agency	Total	New England	Middle Atlantic	Great Lakes	Plains
All Federal Agencies	$12,945	$586	$1,219	$771	$136
Department of Agriculture	628	17	34	54	65
Department of Commerce	280	9	15	4	2
Department of Defense	8,324	509	1,077	464	32
Department of Energy	224	0	28	76	0
Dept. of Health and Human Services	1,200	3	4	10	0
Department of the Interior	342	7	34	17	31
Department of Transportation	138	38	24	6	0
Environmental Protection Agency	105	3	0	26	6
National Aeronautics and Space Admin.	1,171	2	4	113	1
National Science Foundation	143	0	0	0	0

Federal agency	South Atlantic	Southeast	Southwest	Mountain	Pacific
All Federal Agencies	$5,989	$701	$330	$1,425	$1,360
Department of Agriculture	242	29	57	52	76
Department of Commerce	163	5	3	48	31
Department of Defense	3,429	443	76	1,205	1,059
Department of Energy	77	19	0	14	10
Dept. of Health and Human Services	1,130	16	20	13	3
Department of the Interior	79	13	13	78	70
Department of Transportation	56	1	6	1	7
Environmental Protection Agency	57	0	4	4	5
National Aeronautics and Space Admin.	616	175	151	10	99
National Science Foundation	142	0	0	0	1

NOTE: Intramural activities cover costs associated with the planning and administration of intramural and extramural programs by Federal personnel as well as actual intramural R&D performance.

SOURCE: National Science Foundation, SRS

Table B-7. Largest R&D-performing industries by State: 1985

Aircraft & missiles	Electrical equipment	Chemicals	Machinery	Motor vehicles	Other industries
Alabama	Illinois 1/	Delaware 4/	Arizona 6/	Michigan	Alaska
California	Massachusetts 1/	Indiana 5/	Colorado 6/		Arkansas
Connecticut	Mississippi 3/	Louisiana 4/	Iowa 7/		D.C.
Florida	New Hampshire 1/	Nebraska	Kentucky 6/		Idaho
Georgia	New Jersey 1/	West Virginia 4/	Maryland 6/		Maine
Hawaii	New Mexico 1/		Minnesota 6/		Nevada
Kansas	Ohio 3/		Montana 7/		Oklahoma
Missouri	Pennsylvania 3/		New York 6/		Oregon
Tennessee	Rhode Island 1/		North Carolina 6/		Wisconsin
Utah	Texas 2/		North Dakota 7/		Wyoming
Washington			South Carolina		
			South Dakota 7/		
			Vermont 6/		
			Virginia 6/		

1/ Companies in the communication equipment segment (SIC 366) have the highest amount of R&D expenditures.
2/ Companies in the electronic components segment (SIC 367) have the highest amount of R&D expenditures.
3/ Companies in the "other electric equipment" segment (SIC 361-5, 369) have the highest amount of R&D expenditures.
4/ Companies in the industrial chemicals segment (SIC 281-2,286) have the highest amount of R&D expenditures.
5/ Companies in the drugs and medicines segment (SIC 283) have the highest amount of R&D expenditures.
6/ Companies in the computer segment (SIC 357) have the highest amount of R&D expenditures.
7/ Companies in the "other machinery" segment (SIC 351-6, 358-9) have the highest amount of R&D expenditures.

SOURCE: National Science Foundation, SRS

Table B-8. Distribution of industrial R&D performance in 10 leading States by industry: 1985

[Dollars in millions]

Industry	Total U.S.	California	New York	Michigan	New Jersey	Massachusetts
Total	$78,208	$17,760	$7,019	$5,975	$5,547	$4,173
Chemicals & allied products	$8,667	$383	$1,154	$607	$1,322	$125
Petroleum refining	NA*	$442	$81	<$60*	$442-$535*	<$125*
Primary metals	NA*	$59	$41	$70	<$110*	<$125*
Machinery, except electrical	$10,870	$1,237	>$1,500*	$127	$244	$954
Electrical equipment	$17,080	$1,920	$1,503	$60	$2,878	$1,940
Aircraft & missiles	$17,619	$9,953	$413	$114	$58	$274
Motor vehicles & equipment	$7,058	$443-$1,062*	$232	$4,796	<$110*	<$125*
Prof. & scientific instruments	$5,430	$1,061	>$1,000*	<$60*	$333	$559
Food and tobacco products	NA*	$65	$114	$36	$109	<$125*
Rubber products	$1,147	$257	NA*	<$60*	<$110*	<$125*
Nonmanufacturing	$2,851	$1,079	$147	$58	$29	$103

Industry	Pennsylvania	Texas	Illinois	Ohio	All other States
Total	$3,570	$3,492	$3,231	$2,847	$24,594
Chemicals & allied products	$716	$250	$514	$571	$3,025
Petroleum refining	$119	$535	<$85*	NA*	$276
Primary metals	$190	$535-$869*	<$85*	$74	$169
Machinery, except electrical	$255	$413	$632	$190	NA*
Electrical equipment	$1,325	$869	$1,072	$692	$4,821
Aircraft & missiles	$300	$531	$328	$60	$5,588
Motor vehicles & equipment	<$120*	<$50*	<$85*	NA*	$671
Prof. & scientific instruments	$252	$169	$92	$52	NA*
Food and tobacco products	<$120*	$12	$140	$19	$503
Rubber products	<$120*	$10	<$85*	$533	$259
Nonmanufacturing	$40	$82	$32	$75	$1,206

* Exact data are unavailable because of Census Bureau restrictions on publishing data that would disclose individual company operations.

NOTE: NA = not available.

SOURCE: National Science Foundation, SRS

Table B-9. Federal and non-Federal sources of industrial and academic R&D funds by State and region: 1985

[Dollars in millions]

Region and State	Industry Source of funds		Academia Source of funds		
	Federal	Company	Federal	Other	FFRDCs
Total	$26,484	$51,724	$5,964	$3,586	$3,529
New England	2,373	4,549	702	245	264
Middle Atlantic	3,691	12,445	1,017	537	333
Great Lakes	1,081	13,080	815	543	375
Plains	878	2,962	316	334	19
South Atlantic	2,327	4,485	1,014	558	17
Southeast	621	588	165	153	17
Southwest	1,257	2,741	413	472	0
Mountain	1,626	1,870	358	225	779
Pacific	12,111	8,131	1,148	491	1,726
Alabama	253	134	61	43	0
Alaska	NA	NA	13	18	0
Arizona	218	784	65	72	26
Arkansas	0	15	12	18	0
California	10,816	6,944	876	354	1,726
Colorado	150	767	112	47	49
Connecticut	520	1,456	140	55	0
Delaware	NA	NA	11	13	0
D.C.	NA	NA	49	16	0
Florida	820	1,012	101	102	0
Georgia	NA	NA	116	110	0
Hawaii	NA	NA	35	19	0
Idaho	NA	NA	14	7	0
Illinois	287	2,944	240	153	375
Indiana	NA	NA	97	62	0
Iowa	NA	NA	64	68	19
Kansas	NA	NA	31	49	0
Kentucky	0	221	19	35	0
Louisiana	NA	NA	42	83	0
Maine	NA	23	11	10	0
Maryland	813	624	440	99	0
Massachusetts	1,556	2,617	464	145	264
Michigan	85	5,890	175	126	0
Minnesota	NA	NA	88	85	0
Mississippi	NA	NA	19	34	0
Missouri	NA	NA	92	69	0
Montana	NA	NA	9	15	0
Nebraska	NA	NA	25	36	0
Nevada	NA	28	11	9	0
New Hampshire	NA	NA	26	12	0
New Jersey	727	4,820	76	66	132
New Mexico	NA	38	68	37	704
New York	1,913	5,106	639	314	199
North Carolina	1	796	157	97	0
North Dakota	1	9	14	19	0
Ohio	484	2,363	161	100	0
Oklahoma	NA	NA	30	66	0
Oregon	NA	NA	68	46	0
Pennsylvania	1,051	2,519	302	157	2
Rhode Island	NA	NA	43	14	0
South Carolina	NA	NA	30	39	0
South Dakota	0	7	2	7	0
Tennessee	NA	NA	66	41	8
Texas	1,209	2,283	329	304	0
Utah	NA	NA	71	30	0
Vermont	NA	NA	19	9	0
Virginia	459	341	98	72	0
Washington	1,282	901	156	54	0
West Virginia	NA	94	12	10	17
Wisconsin	NA	NA	141	103	0
Wyoming	0	3	7	9	0

NOTE: NA = not available.

SOURCE: National Science Foundation, SRS

Table B-10. R&D performance by doctorate-granting institutions and university-administered FFRDCs by State and field of research: 1985
[Dollars in millions]

Region and State	All fields		Engineering	Life sciences	Physical sciences	Environ. sciences	Math/Comp sciences	Other sciences
	U&Cs	FFRDCs						
Total	$9,524	--	$2,676	$5,182	$2,533	$881	$835	$736
of which FFRDCs	--	$3,529	$1,312	$118	$1,424	$201	$434	$32
Northeast	2,464	597	580	1,347	640	167	150	176
New England	915	264	343	418	203	94	62	59
Connecticut	189	0	13	130	23	5	6	11
Maine	21	0	2	12	1	2	0	3
Massachusetts	583	264	315	215	165	61	51	40
New Hampshire	38	0	3	21	8	4	0	2
Rhode Island	57	0	10	13	5	22	5	2
Vermont	28	0	1	25	1	0	0	1
Middle Atlantic	1,549	333	236	929	437	74	88	117
New Jersey	141	132	21	59	154	10	9	20
New York	949	199	129	636	238	52	37	57
Pennsylvania	458	2	87	234	45	12	43	40
North Central	1,988	394	404	1,147	462	106	57	206
Great Lakes	1,355	375	332	705	407	84	40	162
Illinois	393	375	171	203	277	46	19	53
Indiana	159	0	29	78	34	2	5	11
Michigan	301	0	41	154	40	12	5	49
Ohio	262	0	65	136	29	4	4	24
Wisconsin	240	0	26	134	27	20	8	25
Plains	633	19	72	442	56	22	17	44
Iowa	132	19	22	85	27	1	8	8
Kansas	66	0	8	38	4	4	1	12
Minnesota	173	0	18	127	11	4	3	10
Missouri	161	0	19	117	8	5	5	8
Nebraska	61	0	1	47	4	5	0	2
North Dakota	31	0	2	23	1	2	0	3
South Dakota	9	0	1	5	1	1	0	1
South	2,682	25	435	1,432	278	192	146	187
South Atlantic	1,539	17	299	694	189	113	119	104
Delaware	24	0	8	6	3	5	1	1
Dist. of Col.	64	0	7	37	9	0	3	8
Florida	203	0	26	105	19	28	5	21
Georgia	226	0	68	102	14	9	11	15
Maryland	530	0	134	142	92	39	82	31
North Carolina	245	0	15	163	14	11	10	14
South Carolina	66	0	8	39	6	6	2	5
Virginia	168	0	30	94	15	15	5	7
West Virginia	12	17	3	7	18	0	0	1
Southeast	301	8	39	232	15	4	2	16
Alabama	104	0	13	82	4	1	1	3
Kentucky	54	0	10	41	1	0	0	2
Mississippi	53	0	6	39	3	1	0	4
Tennessee	90	8	10	70	7	2	1	8
Southwest	843	0	97	505	74	75	25	67
Arkansas	30	0	4	22	2	0	0	2
Louisiana	126	0	12	85	7	11	4	6
Oklahoma	96	0	17	49	7	7	5	11
Texas	591	0	63	349	58	57	15	48
West	2,217	2,505	1,257	1,256	1,153	416	481	167
Mountain	580	779	339	286	450	133	88	69
Arizona	137	26	19	52	59	17	3	13
Colorado	159	49	24	79	31	64	3	15
Idaho	21	0	3	16	1	1	0	1
Montana	24	0	2	16	3	0	0	2
Nevada	19	0	1	8	0	9	0	1
New Mexico	102	704	274	58	341	25	79	29
Utah	101	0	16	47	12	15	4	6
Wyoming	16	0	1	9	2	2	0	1
Pacific	1,638	1,726	917	970	703	282	393	99
Alaska	29	0	2	8	0	17	0	1
California	1,231	1,726	895	740	664	210	386	62
Hawaii	54	0	2	16	10	17	0	8
Oregon	114	0	4	68	14	20	2	6
Washington	210	0	14	137	14	18	4	22

NOTE: Detail may not add to totals. Total performance data were revised after field data were published.
SOURCE: National Science Foundation, SRS

Table B-11. Funds for academic R&D by region, and by Federal agency and non-Federal funding sources: 1985

Federal obligations to universities and colleges, by agency 1/

Region	Total ($ millions)	Agriculture	Defense	Energy	HHS	NASA	NSF	Other
United States	$6,149	4.8%	15.3%	5.8%	51.2%	4.1%	16.3%	2.5%
New England	785	1.8	18.3	8.8	48.2	4.1	17.1	1.8
Middle Atlantic	1,145	1.9	15.8	4.9	56.3	1.8	17.6	1.6
Great Lakes	831	4.8	11.0	6.5	50.4	4.6	20.6	2.2
Plains	343	11.1	5.5	2.9	62.7	3.5	11.7	2.6
South Atlantic	853	6.1	17.8	4.7	51.8	4.2	12.1	3.3
Southeast	208	15.9	5.8	7.2	58.7	3.8	5.8	2.9
Southwest	386	8.3	10.1	4.9	58.3	3.9	11.9	2.6
Mountain	351	6.0	24.5	6.0	34.2	7.4	16.5	5.4
Pacific	1,233	2.8	17.6	5.8	46.7	5.4	19.1	2.7

Federal obligations to FFRDCs, by agency 2/

Region	Total ($ millions)	Defense	Energy	NASA	Other
United States	$2,508	12.2%	73.7%	9.2%	4.9%
New England	108	93.5	--	--	6.5
Middle Atlantic	265	1.9	96.6	--	1.5
Great Lakes	270	1.9	97.8	--	0.4
Plains	15	--	100.0	--	--
South Atlantic	108	83.3	--	--	16.7
Southeast	13	7.7	84.6	--	7.7
Southwest	0	--	--	--	--
Mountain	623	8.2	82.2	--	9.6
Pacific	1,099	4.9	71.9	20.9	2.3

Non-Federal sources 3/

Region	Total ($ millions)	State & local govts.	Industry	Institutional funds	Other sources
United States	$3,454	19.0%	15.3%	45.7%	20.1%
New England	237	5.9	27.8	31.6	34.6
Middle Atlantic	532	13.3	18.8	39.5	28.4
Great Lakes	544	21.3	14.2	48.7	15.8
Plains	322	27.6	10.9	48.1	13.4
South Atlantic	513	17.9	17.7	52.2	12.1
Southeast	146	37.0	17.1	35.6	10.3
Southwest	433	25.4	12.0	43.2	19.4
Mountain	223	21.6	21.4	44.4	12.6
Pacific	489	10.8	7.4	53.0	28.8

1/ Obligation data as reported by funding agency. Excludes funds to FFRDCs.
2/ Obligations to university-administered FFRDCs as reported by funding agency.
3/ Includes expenditures reported by doctorate-granting institutions only.

NOTE: Federal obligations to the academic sector reported by funding agencies differ somewhat from expenditures of Federal funds reported by university performers.

SOURCE: National Science Foundation, SRS

Table B-12. Geographic distribution of total R&D performance: 1975 and 1985, and 1975-85 average annual growth

[Dollars in millions]

Region and State	1975 total	Share of total	1985 total	Share of total	Average annual growth Nominal	Real 1/
United States	$35,213	100.0%	$107,456	100.0%	11.8%	5.0%
New England	2,911	8.3%	9,538	8.9%	12.6%	5.8%
Middle Atlantic	6,552	18.6%	19,441	18.1%	11.5%	4.7%
Great Lakes	5,990	17.0%	16,798	15.6%	10.9%	4.1%
Plains	1,356	3.8%	4,680	4.4%	13.2%	6.3%
South Atlantic	4,680	13.3%	14,616	13.6%	12.1%	5.3%
Southeast	859	2.4%	2,258	2.1%	10.2%	3.5%
Southwest	1,376	3.9%	5,230	4.9%	14.3%	7.3%
Mountain	1,570	4.5%	6,387	5.9%	15.1%	8.1%
Pacific	7,414	21.1%	25,487	23.7%	13.1%	6.3%
Alabama	346	1.0%	973	0.9%	10.9%	4.2%
Alaska	--	--	--	--	--	--
Arizona	327	0.9%	1,269	1.2%	14.5%	7.6%
Arkansas	41	0.1%	68	0.1%	5.2%	-1.2%
California	6,559	18.6%	22,293	20.7%	13.0%	6.2%
Colorado	346	1.0%	1,309	1.2%	14.2%	7.3%
Connecticut	910	2.6%	2,310	2.1%	9.8%	3.1%
Delaware	--	--	--	--	--	--
D.C.	501	1.4%	--	--	--	--
Florida	855	2.4%	2,404	2.2%	10.9%	4.2%
Georgia	181	0.5%	831	0.8%	16.5%	9.4%
Hawaii	--	--	--	--	--	--
Idaho	--	--	454	0.4%	--	--
Illinois	1,422	4.0%	4,154	3.9%	11.3%	4.6%
Indiana	536	1.5%	1,643	1.5%	11.9%	5.1%
Iowa	245	0.7%	488	0.5%	7.2%	0.7%
Kansas	95	0.3%	359	0.3%	14.2%	7.3%
Kentucky	109	0.3%	306	0.3%	10.9%	4.1%
Louisiana	152	0.4%	348	0.3%	8.7%	2.1%
Maine	23	0.1%	--	--	--	--
Maryland	1,638	4.7%	4,951	4.6%	11.7%	4.9%
Massachusetts	1,726	4.9%	6,022	5.6%	13.3%	6.4%
Michigan	2,134	6.1%	6,370	5.9%	11.6%	4.8%
Minnesota	499	1.4%	2,211	2.1%	16.1%	9.0%
Mississippi	68	0.2%	245	0.2%	13.7%	6.8%
Missouri	449	1.3%	1,424	1.3%	12.2%	5.4%
Montana	--	--	--	--	--	--
Nebraska	40	0.1%	116	0.1%	11.4%	4.6%
Nevada	61	0.2%	--	--	--	--
New Hampshire	--	--	368	0.3%	--	--
New Jersey	1,754	5.0%	6,722	6.3%	14.4%	7.4%
New Mexico	--	--	--	--	--	--
New York	2,846	8.1%	8,371	7.8%	11.4%	4.6%
North Carolina	375	1.1%	1,193	1.1%	12.3%	5.5%
North Dakota	--	--	57	0.1%	--	--
Ohio	1,553	4.4%	3,688	3.4%	9.0%	2.4%
Oklahoma	137	0.4%	443	0.4%	12.5%	5.6%
Oregon	135	0.4%	450	0.4%	12.8%	5.9%
Pennsylvania	1,952	5.5%	4,348	4.0%	8.3%	1.8%
Rhode Island	100	0.3%	493	0.5%	17.3%	10.2%
South Carolina	60	0.2%	476	0.4%	22.9%	15.5%
South Dakota	--	--	23	0.0%	--	--
Tennessee	337	1.0%	734	0.7%	8.1%	1.5%
Texas	1,047	3.0%	4,372	4.1%	15.4%	8.4%
Utah	153	0.4%	491	0.5%	12.4%	5.6%
Vermont	--	--	--	--	--	--
Virginia	709	2.0%	1,947	1.8%	10.6%	3.9%
Washington	645	1.8%	2,596	2.4%	14.9%	8.0%
West Virginia	--	--	--	--	--	--
Wisconsin	345	1.0%	944	0.9%	10.6%	3.9%
Wyoming	--	--	27	0.0%	--	--

1/ Based on GNP implicit price deflator, 1982 dollars.
NOTE: -- Industrial R&D performance data are not available.

SOURCE: National Science Foundation, SRS

appendix c

state personnel and funding profiles

The following tables contain summary information on the science and technology resource base in the United States, each of the 50 States, and the District of Columbia. Data on additional demographic and economic variables also are detailed.

The National Science Foundation's Division of Science Resources Studies is the source for the data on science and engineering personnel and on R&D funds.

Other Federal data sources are:

- Bureau of the Census, Department of Commerce;
- Bureau of Economic Analysis (BEA), Department of Commerce;
- Bureau of Labor Statistics (BLS) Department of Labor.

Population, Federal expenditures and manufactures' shipments data are from Census; personal income and gross State product data are from BEA; and BLS is the source for labor force data. Federal expenditures include grants, salaries and wages, direct payments to individuals, and procurements which are on an obligation basis.

UNITED STATES PROFILE

PERSONNEL CHARACTERISTICS	
Scientists, 1986	2,186,300
Engineers, 1986	2,440,100
Doctoral scientists, 1987	380,312
Doctoral engineers, 1987	71,126
New S&E doctorates awarded, 1987	19,222
S&E postdoctorates, 1987, in doctorate-granting institutions	25,270
S&E graduate students, 1987, in doctorate-granting institutions	388,681
Population, 1987 (000s)	243,400
Civilian labor force, 1987 (000s)	119,899

FUNDING CHARACTERISTICS ($ millions)	
Federal expenditures, 1987	$847,810
Federal R&D obligations, 1987	$54,066
Industrial R&D performance, 1985	$78,208
Academic R&D performance at doctorate-granting institutions, 1987	$11,931
Total R&D performance, 1985	$107,436
Personal income, 1987	$3,733,719
Gross state product, 1986	$4,191,705
Manufacturers shipments, 1986	$2,260,315

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN THE UNITED STATES
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Universities & Colleges	Other Nonprofit Institutions	State and Local Governments
	$54,065,662	$12,973,933	$28,496,194	$10,376,218	$2,081,161	$138,156
Department of Agriculture	940,467	649,046	5,322	279,943	5,043	1,113
Department of Commerce	402,149	320,248	32,094	36,835	8,685	4,287
Department of Defense	35,083,844	8,335,950	24,258,211	1,754,456	735,176	51
Department of Energy	4,754,118	247,880	2,127,357	2,225,513	153,245	123
Dept. of Health & Human Services	6,569,654	1,292,874	256,803	3,983,407	952,265	84,305
Dept. of the Interior	403,520	354,602	13,767	33,353	281	1,517
Department of Transportation	324,342	137,579	109,814	25,184	16,233	35,532
Environmental Protection Agency	348,244	78,596	172,065	67,465	24,768	5,350
Nat'l Aeronautics & Space Admin.	3,770,248	1,413,839	1,463,133	785,141	103,094	5,041
National Science Foundation	1,469,076	143,319	57,628	1,184,921	82,371	837

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

ALABAMA STATE PROFILE

PERSONNEL CHARACTERISTICS	ALABAMA	RANK
Scientists, 1986	27,000	24
Engineers, 1986	29,300	25
Doctoral scientists, 1987	3,725	28
Doctoral engineers, 1987	615	31
New S&E doctorates awarded, 1987	138	32
S&E postdoctorates, 1987, in doctorate-granting institutions	258	25
S&E graduate students, 1987, in doctorate-granting institutions	4,798	25
Population, 1987 (000s)	4,083	22
Civilian labor force, 1987 (000s)	1,893	22

FUNDING CHARACTERISTICS ($ millions)	ALABAMA	RANK
Federal expenditures, 1987	$13,927	20
Federal R&D obligations, 1987	$1,347	14
Industrial R&D performance, 1985	$387	28
Academic R&D performance at doctorate-granting institutions, 1987	$133	24
Total R&D performance, 1985	$971	23
Personal income, 1987	$48,098	24
Gross state product, 1986	$55,007	24
Manufacturers shipments, 1986	$36,537	22

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN ALABAMA
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$1,346,561	$584,230	$642,183	$98,927	$20,822	$399	
Department of Agriculture	10,485	3,422	--	7,063	--	--	30
Department of Commerce	170	--	--	170	--	--	38
Department of Defense	960,311	397,535	547,907	7,182	7,687	--	12
Department of Energy	8,578	--	7,000	1,578	--	--	27
Dept. of Health & Human Services	78,420	--	428	67,483	10,371	138	21
Dept. of the Interior	6,354	6,044	--	259	--	51	19
Department of Transportation	294	58	62	--	--	174	36
Environmental Protection Agency	3,933	2,154	37	889	817	36	22
Nat'l Aeronautics & Space Admin.	274,681	175,017	86,704	11,113	1,847	--	6
National Science Foundation	3,335	--	45	3,190	100	--	41
State Rank	14	7	14	25	15	45	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

ALASKA STATE PROFILE

PERSONNEL CHARACTERISTICS	ALASKA	RANK
Scientists, 1986	6,500	46
Engineers, 1986	4,100	46
Doctoral scientists, 1987	909	50
Doctoral engineers, 1987	33	50
New S&E doctorates awarded, 1987	7	51
S&E postdoctorates, 1987, in doctorate-granting institutions	--	51
S&E graduate students, 1987, in doctorate-granting institutions	387	51
Population, 1987 (000s)	525	50
Civilian labor force, 1987 (000s)	249	50

FUNDING CHARACTERISTICS ($ millions)	ALASKA	RANK
Federal expenditures, 1987	$2,846	47
Federal R&D obligations, 1987	$49	45
Industrial R&D performance, 1985	$0-$14	40-51
Academic R&D performance at doctorate-granting institutions, 1987	$30	44
Total R&D performance, 1985	$59-$73	43-51
Personal income, 1987	$9,395	47
Gross state product, 1986	$19,575	39
Manufacturers shipments, 1986	$2,015	49

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN ALASKA
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$48,645	$32,840	$254	$14,946	$157	$448	
Department of Agriculture	4,975	3,847	--	1,128	--	--	41
Department of Commerce	6,150	5,099	21	981	49	--	10
Department of Defense	8,707	8,397	--	310	--	--	46
Department of Energy	698	--	100	598	--	--	45
Dept. of Health & Human Services	618	--	--	178	108	176	51
Dept. of the Interior	15,847	15,497	133	--	--	39	7
Department of Transportation	233	--	--	6	--	233	38
Environmental Protection Agency	8	--	--	3,289	--	--	51
Nat'l Aeronautics & Space Admin.	3,289	--	--	8,122	--	--	33
National Science Foundation	8,122	--	--	--	--	--	30
State Rank	45	31	49	44	51	43	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

ARIZONA STATE PROFILE

PERSONNEL CHARACTERISTICS	ARIZONA	RANK
Scientists, 1986	16,700	32
Engineers, 1986	32,900	23
Doctoral scientists, 1987	4,340	26
Doctoral engineers, 1987	802	26
New S&E doctorates awarded, 1987	296	22
S&E postdoctorates, 1987, in doctorate-granting institutions	303	23
S&E graduate students, 1987, in doctorate-granting institutions	7,208	17
Population, 1987 (000s)	3,386	25
Civilian labor force, 1987 (000s)	1,614	27

FUNDING CHARACTERISTICS ($ millions)	ARIZONA	RANK
Federal expenditures, 1987	$12,561	23
Federal R&D obligations, 1987	$415	25
Industrial R&D performance, 1985	$1,002	17
Academic R&D performance at doctorate-granting institutions, 1987	$181	22
Total R&D performance, 1985	$1,269	21
Personal income, 1987	$47,502	25
Gross state product, 1986	$53,253	25
Manufacturers shipments, 1986	$17,730	33

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN ARIZONA
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$414,644	$83,236	$214,976	$105,535	$8,782	$2,115	
Department of Agriculture	14,115	10,720	202	3,140	29	24	23
Department of Commerce	44	--	--	44	--	--	45
Department of Defense	281,516	58,504	209,062	13,950	--	--	22
Department of Energy	1,785	--	--	1,785	--	--	38
Dept. of Health & Human Services	46,863	4,817	596	33,617	7,196	637	27
Dept. of the Interior	6,393	5,402	--	924	--	67	17
Department of Transportation	3,295	867	1,216	25	--	1,187	18
Environmental Protection Agency	2,742	--	100	1,326	1,116	200	26
Nat'l Aeronautics & Space Admin.	18,232	2,926	3,767	11,188	351	--	19
National Science Foundation	39,659	--	33	39,536	90	--	9
State Rank	25	23	22	24	25	12	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

ARKANSAS STATE PROFILE

PERSONNEL CHARACTERISTICS	ARKANSAS	RANK
Scientists, 1986	19,800	31
Engineers, 1986	6,800	44
Doctoral scientists, 1987	1,775	39
Doctoral engineers, 1987	217	42
New S&E doctorates awarded, 1987	61	41
S&E postdoctorates, 1987, in doctorate-granting institutions	42	42
S&E graduate students, 1987, in doctorate-granting institutions	1,199	41
Population, 1987 (000s)	2,388	33
Civilian labor force, 1987 (000s)	1,090	33

FUNDING CHARACTERISTICS ($ millions)	ARKANSAS	RANK
Federal expenditures, 1987	$7,316	35
Federal R&D obligations, 1987	$52	43
Industrial R&D performance, 1985	$15	40-51
Academic R&D performance at doctorate-granting institutions, 1987	$36	41
Total R&D performance, 1985	$68	43-51
Personal income, 1987	$27,090	32
Gross state product, 1986	$32,633	33
Manufacturers shipments, 1986	$22,131	29

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN ARKANSAS
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$52,343	$24,196	$12,474	$13,807	$935	$931	
Department of Agriculture	7,014	1,755	--	5,192	--	67	38
Department of Commerce	--	--	--	--	--	--	51
Department of Defense	12,347	116	11,714	517	--	--	41
Department of Energy	390	--	--	390	--	--	47
Dept. of Health & Human Services	26,[illegible]	19,242	50	5,655	935	238	32
Dept. of the Interior	3,291	3,083	--	168	--	40	34
Department of Transportation	586	--	--	--	--	586	29
Environmental Protection Agency	243	--	--	243	--	--	42
Nat'l Aeronautics & Space Admin.	441	--	169	272	--	--	49
National Science Foundation	1,911	--	541	1,370	--	--	46
State Rank	43	35	41	45	38	28	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

CALIFORNIA STATE PROFILE

PERSONNEL CHARACTERISTICS	CALIFORNIA	RANK
Scientists, 1986	257,900	1
Engineers, 1986	375,500	1
Doctoral scientists, 1987	46,448	1
Doctoral engineers, 1987	11,397	1
New S&E doctorates awarded, 1987	2,524	1
S&E postdoctorates, 1987, in doctorate-granting institutions	4,472	1
S&E graduate students, 1987, in doctorate-granting institutions	42,943	1
Population, 1987 (000s)	27,663	1
Civilian labor force, 1987 (000s)	13,747	1

FUNDING CHARACTERISTICS ($ millions)	CALIFORNIA	RANK
Federal expenditures, 1987	$100,753	1
Federal R&D obligations, 1987	$13,671	1
Industrial R&D performance, 1985	$17,760	1
Academic R&D performance at doctorate-granting institutions, 1987	$1,552	1
Total R&D performance, 1985	$22,293	1
Personal income, 1987	$488,573	1
Gross state product, 1986	$533,816	1
Manufacturers shipments, 1986	$224,517	1

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN CALIFORNIA
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$13,670,882	$2,011,033	$8,603,576	$2,656,007	$383,113	$17,153	
Department of Agriculture	55,737	42,218	--	12,939	580	--	3
Department of Commerce	34,352	11,187	20,072	2,101	417	575	5
Department of Defense	10,445,684	1,706,343	8,046,512	485,970	206,849	10	1
Department of Energy	943,756	1,384	105,854	834,566	1,952	--	2
Dept. of Health & Human Services	777,992	1,495	30,775	580,937	152,777	12,008	2
Dept. of the Interior	27,939	22,084	193	5,662	--	--	5
Department of Transportation	20,310	5,505	6,311	5,134	--	3,160	8
Environmental Protection Agency	20,239	--	13,016	5,038	897	1,288	6
Nat'l Aeronautics & Space Admin.	1,142,106	220,290	369,579	546,138	6,099	--	1
National Science Foundation	202,767	527	11,064	177,522	13,542	112	1
State Rank	1	2	1	1	2	2	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

COLORADO STATE PROFILE

PERSONNEL CHARACTERISTICS	COLORADO	RANK
Scientists, 1986	45,000	16
Engineers, 1986	45,900	18
Doctoral scientists, 1987	7,027	18
Doctoral engineers, 1987	2,029	12
New S&E doctorates awarded, 1987	375	18
S&E postdoctorates, 1987, in doctorate-granting institutions	376	21
S&E graduate students, 1987, in doctorate-granting institutions	7,722	16
Population, 1987 (000s)	3,296	26
Civilian labor force, 1987 (000s)	1,697	24

FUNDING CHARACTERISTICS ($ millions)	COLORADO	RANK
Federal expenditures, 1987	$12,301	24
Federal R&D obligations, 1987	$1,516	13
Industrial R&D performance, 1985	$917	18
Academic R&D performance at doctorate-granting institutions, 1987	$186	21
Total R&D performance, 1985	$1,309	20
Personal income, 1987	$52,287	22
Gross state product, 1986	$59,177	23
Manufacturers shipments, 1986	$20,015	32

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN COLORADO
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$1,516,301	$132,807	$1,131,003	$178,020	$72,827	$1,644	
Department of Agriculture	18,660	14,754	27	3,875	4	--	17
Department of Commerce	52,545	46,903	53	4,569	536	--	2
Department of Defense	1,095,111	37,861	1,043,255	13,905	90	--	11
Department of Energy	71,226	1,172	4,429	13,393	52,232	--	12
Dept. of Health & Human Services	73,291	44	2,075	57,412	12,829	931	22
Dept. of the Interior	30,661	27,884	1,333	1,404	--	40	2
Department of Transportation	7,711	450	1,648	8	5,192	413	11
Environmental Protection Agency	2,004	--	599	1,145	--	260	29
Nat'l Aeronautics & Space Admin.	94,724	3,456	76,407	13,592	1,269	--	9
National Science Foundation	70,371	283	696	68,717	675	--	6
State Rank	13	15	8	14	8	16	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

CONNECTICUT STATE PROFILE

PERSONNEL CHARACTERISTICS	CONNECTICUT	RANK
Scientists, 1986	42,700	19
Engineers, 1986	58,500	12
Doctoral scientists, 1987	6,876	19
Doctoral engineers, 1987	759	28
New S&E doctorates awarded, 1987	335	19
S&E postdoctorates, 1987, in doctorate-granting institutions	845	8
S&E graduate students, 1987, in doctorate-granting institutions	4,553	26
Population, 1987 (000s)	3,211	28
Civilian labor force, 1987 (000s)	1,752	23

FUNDING CHARACTERISTICS ($ millions)	CONNECTICUT	RANK
Federal expenditures, 1987	$13,600	21
Federal R&D obligations, 1987	$672	18
Industrial R&D performance, 1985	$1,976	11
Academic R&D performance at doctorate-granting institutions, 1987	$231	15
Total R&D performance, 1985	$2,310	14
Personal income, 1987	$67,371	19
Gross state product, 1986	$70,639	22
Manufacturers shipments, 1986	$35,974	24

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN CONNECTICUT
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$672,149	$17,719	$476,165	$169,807	$6,710	$1,748	
Department of Agriculture	4,283	1,671	9	1,840	4	759	43
Department of Commerce	1,784	--	--	1,539	10	235	15
Department of Defense	410,934	6,456	395,510	8,921	47	--	17
Department of Energy	15,826	--	7,491	8,335	--	--	22
Dept. of Health & Human Services	140,628	82	1,247	133,718	5,152	429	12
Dept. of the Interior	2,173	2,089	--	84	--	--	47
Department of Transportation	8,812	7,421	1,065	--	90	236	10
Environmental Protection Agency	6,500	--	5,388	540	483	89	15
Nat'l Aeronautics & Space Admin.	65,665	--	64,756	656	253	--	12
National Science Foundation	15,544	--	699	14,174	671	--	23
State Rank	18	43	16	15	27	13	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

DELAWARE STATE PROFILE

PERSONNEL CHARACTERISTICS	DELAWARE	RANK
Scientists, 1986	9,500	42
Engineers, 1986	7,000	41
Doctoral scientists, 1987	3,255	33
Doctoral engineers, 1987	912	22
New S&E doctorates awarded, 1987	74	39
S&E postdoctorates, 1987, in doctorate-granting institutions	0	51
S&E graduate students, 1987, in doctorate-granting institutions	1,303	47
Population, 1987 (000s)	644	47
Civilian labor force, 1987 (000s)	331	47

FUNDING CHARACTERISTICS ($ millions)	DELAWARE	RANK
Federal expenditures, 1987	$1,82c	49
Federal R&D obligations, 1987	$32	47
Industrial R&D performance, 1985	$800-$917	19
Academic R&D performance at doctorate-granting institutions, 1987	$32	42
Total R&D performance, 1985	$828-$945	24-26
Personal income, 1987	$10,457	45
Gross state product, 1986	$11,706	47
Manufacturers shipments, 1986	$8,664	39

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN DELAWARE
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$32,331	$2,874	$13,606	$12,953	$2,647	$251	
Department of Agriculture	2,766	1,154	4	1,608	--	--	49
Department of Commerce	575	--	--	452	33	90	19
Department of Defense	13,543	154	11,629	1,760	--	--	39
Department of Energy	909	--	600	453	156	--	44
Dept. of Health & Human Services	5,093	--	92	3,196	1,700	105	45
Dept. of the Interior	1,650	1,566	--	84	--	--	49
Department of Transportation	11	--	--	--	--	11	51
Environmental Protection Agency	170	--	80	45	--	45	43
Nat'l Aeronautics & Space Admin.	1,866	--	1,446	391	29	--	38
National Science Foundation	5,748	--	55	4,964	729	--	32
State Rank	47	51	40	46	33	49	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

DISTRICT OF COLUMBIA PROFILE

	D.C.	RANK
PERSONNEL CHARACTERISTICS		
Scientists, 1986	53,600	14
Engineers, 1986	14,900	33
Doctoral scientists, 1987	12,629	10
Doctoral engineers, 1987	1,102	18
New S&E doctorates awarded, 1987	258	25
S&E postdoctorates, 1987, in doctorate-granting institutions	134	32
S&E graduate students, 1987, in doctorate-granting institutions	9,656	12
Population, 1987 (000s)	622	48
Civilian labor force, 1987 (000s)	333	46

	D.C.	RANK
FUNDING CHARACTERISTICS ($ millions)		
Federal expenditures, 1987	$14,530	19
Federal R&D obligations, 1987	$2,208	8
Industrial R&D performance, 1985	$0.574	40-51
Academic R&D performance at doctorate-granting institutions, 1987	$85	33
Total R&D performance, 1985	$1,685-$1,759	17
Personal income, 1987	$12,626	43
Gross state product, 1986	$28,791	34
Manufacturers shipments, 1986	$7,854	50

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN D.C.
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$2,208,106	$1,206,159	$833,794	$65,005	$100,524	$644	
Department of Agriculture	105,065	100,808	3,358	769	128	--	1
Department of Commerce	27,194	21,169	193	3,763	2,069	--	6
Department of Defense	1,412,807	626,325	767,782	4,851	13,849	--	9
Department of Energy	139,522	103,107	20,302	1,076	15,037	--	10
Dept. of Health & Human Services	118,087	57,139	4,810	40,632	15,175	331	14
Dept. of the Interior	28,501	27,914	6	377	--	--	4
Department of Transportation	31,12.	19,950	10,205	100	830	41	4
Environmental Protection Agency	21,722	--	15,431	774	7,515	2	5
Nat'l Aeronautics & Space Admin.	145,226	113,587	11,641	4,521	15,007	470	8
National Science Foundation	179,039	136,157	2,066	8,142	30,694	--	2
State Rank	6	3	12	29	5	31	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

FLORIDA STATE PROFILE

	FLORIDA	RANK
PERSONNEL CHARACTERISTICS		
Scientists, 1986	53,700	13
Engineers, 1986	80,000	10
Doctoral scientists, 1987	9,004	14
Doctoral engineers, 1987	1,594	13
New S&E doctorates awarded, 1987	451	12
S&E postdoctorates, 1987, in doctorate-granting institutions	469	16
S&E graduate students, 1987, in doctorate-granting institutions	13,618	9
Population, 1987 (000s)	12,023	4
Civilian labor force, 1987 (000s)	5,870	4

	FLORIDA	RANK
FUNDING CHARACTERISTICS ($ millions)		
Federal expenditures, 1987	$41,398	4
Federal R&D obligations, 1987	$2,298	5
Industrial R&D performance, 1985	$1,832	13
Academic R&D performance at doctorate-granting institutions, 1987	$252	13
Total R&D performance, 1985	$2,404	13
Personal income, 1987	$183,259	5
Gross state product, 1986	$177,729	6
Manufacturers shipments, 1986	$50,322	16

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN FLORIDA
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$2,297,807	$719,058	$1,424,655	$145,178	$5,442	$3,476	
Department of Agriculture	25,569	18,434	--	7,515	--	--	10
Department of Commerce	36,136	32,238	597	2,004	903	594	4
Department of Defense	1,773,111	445,929	1,312,621	13,334	1,227	--	4
Department of Energy	15,029	--	--	15,029	--	--	24
Dept. of Health & Human Services	81,819	--	980	77,191	2,796	852	20
Dept. of the Interior	6,117	5,845	--	272	--	--	22
Department of Transportation	23,125	--	20,974	119	--	2,030	6
Environmental Protection Agency	7,340	2,562	2,571	2,149	58	--	13
Nat'l Aeronautics & Space Admin.	305,413	214,050	86,689	4,674	--	--	4
National Science Foundation	24,150	--	421	23,271	458	--	17
State Rank	5	6	6	17	29	6	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

GEORGIA STATE PROFILE

PERSONNEL CHARACTERISTICS	GEORGIA	RANK
Scientists, 1986	43,100	18
Engineers, 1986	42,000	21
Doctoral scientists, 1987	6,506	21
Doctoral engineers, 1987	733	30
New S&E doctorates awarded, 1987	317	20
S&E postdoctorates, 1987, in doctorate-granting institutions	296	24
S&E graduate students, 1987, in doctorate-granting institutions	6,928	18
Population, 1987 (000s)	6,222	11
Civilian labor force, 1987 (000s)	3,053	12

FUNDING CHARACTERISTICS ($ millions)	GEORGIA	RANK
Federal expenditures, 1987	$19,166	14
Federal R&D obligations, 1987	$352	27
Industrial R&D performance, 1985	$515	25
Academic R&D performance at doctorate-granting institutions, 1987	$324	10
Total R&D performance, 1985	$831	24-26
Personal income, 1987	$87,720	12
Gross state product, 1986	$102,922	12
Manufacturers shipments, 1986	$67,848	11

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN GEORGIA
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$352,174	$96,266	$127,050	$125,255	$2,189	$1,414	
Department of Agriculture	36,837	28,933	17	7,778	53	56	5
Department of Commerce	460	15	16	403	26	--	31
Department of Defense	154,215	24,553	107,495	22,055	112	--	27
Department of Energy	5,638	38	--	4,800	800	--	32
Dept. of Health & Human Services	106,357	32,887	506	72,026	781	157	16
Dept. of the Interior	3,786	3,392	--	347	--	47	29
Department of Transportation	1,362	683	--	108	--	571	23
Environmental Protection Agency	5,081	3,207	310	1,390	30	144	19
Nat'l Aeronautics & Space Admin.	24,865	2,558	18,403	3,517	387	--	16
National Science Foundation	13,573	--	303	12,831	--	439	24
State Rank	27	21	29	19	35	19	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

HAWAII STATE PROFILE

PERSONNEL CHARACTERISTICS	HAWAII	RANK
Scientists, 1986	9,400	43
Engineers, 1986	9,300	37
Doctoral scientists, 1987	2,262	37
Doctoral engineers, 1987	209	43
New S&E doctorates awarded, 1987	102	38
S&E postdoctorates, 1987, in doctorate-granting institutions	43	41
S&E graduate students, 1987, in doctorate-granting institutions	1,964	38
Population, 1987 (000s)	1,083	39
Civilian labor force, 1987 (000s)	514	42

FUNDING CHARACTERISTICS ($ millions)	HAWAII	RANK
Federal expenditures, 1987	$4,759	39
Federal R&D obligations, 1987	$64	41
Industrial R&D performance, 1985	$0-$14	40-51
Academic R&D performance at doctorate-granting institutions, 1987	$57	38
Total R&D performance, 1985	$76-$90	43-51
Personal income, 1987	$16,634	39
Gross state product, 1986	$19,320	41
Manufacturers shipments, 1986	$3,086	45

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN HAWAII
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$64,372	$23,218	$4,660	$31,188	$4,711	$595	
Department of Agriculture	9,898	4,040	--	3,746	2,102	10	32
Department of Commerce	2,715	886	208	1,302	89	230	14
Department of Defense	14,045	12,101	364	1,580	--	--	38
Department of Energy	5,336	--	4,000	1,336	--	--	33
Dept. of Health & Human Services	9,534	--	44	7,130	2,147	213	43
Dept. of the Interior	6,906	6,191	--	715	--	--	16
Department of Transportation	142	--	--	--	--	142	43
Environmental Protection Agency	25	--	--	25	--	--	30
Nat'l Aeronautics & Space Admin.	5,388	--	44	5,344	--	--	31
National Science Foundation	10,383	--	--	10,010	373	--	29
State Rank	41	36	44	38	31	38	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

IDAHO STATE PROFILE

PERSONNEL CHARACTERISTICS	IDAHO	RANK
Scientists, 1986	8,100	45
Engineers, 1986	6,900	43
Doctoral scientists, 1987	1,422	44
Doctoral engineers, 1987	304	40
New S&E doctorates awarded, 1987	32	46
S&E postdoctorates, 1987, in doctorate-granting institutions	25	45
S&E graduate students, 1987, in doctorate-granting institutions	1,173	42
Population, 1987 (000s)	998	42
Civilian labor force, 1987 (000s)	471	43

FUNDING CHARACTERISTICS ($ millions)	IDAHO	RANK
Federal expenditures, 1987	$3,164	43
Federal R&D obligations, 1987	$233	29
Industrial R&D performance, 1985	$419	26
Academic R&D performance at doctorate-granting institutions, 1987	$25	48
Total R&D performance, 1985	$454	32
Personal income, 1987	$11,799	44
Gross state product, 1986	$13,170	45
Manufacturers shipments, 1986	$5,920	41

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN IDAHO
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$232,726	$15,342	$162,595	$54,324	$275	$190	
Department of Agriculture	11,882	8,166	--	3,716	--	--	27
Department of Commerce	8	--	8	--	--	--	48
Department of Defense	2,584	1,758	822	4	--	--	47
Department of Energy	206,141	293	158,005	1,208	--	--	8
Dept. of Health & Human Services	997	--	--	639	275	83	50
Dept. of the Interior	9,750	4,873	3,760	1,051	--	66	13
Department of Transportation	41	--	--	--	--	41	49
Environmental Protection Agency	29	--	--	29	--	--	49
Nat'l Aeronautics & Space Admin.	527	252	--	275	--	--	47
National Science Foundation	767	--	--	767	--	--	51
State Rank	29	44	24	31	44	50	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

ILLINOIS STATE PROFILE

PERSONNEL CHARACTERISTICS	ILLINOIS	RANK
Scientists, 1986	92,700	6
Engineers, 1986	107,800	7
Doctoral scientists, 1987	15,769	6
Doctoral engineers, 1987	2,884	7
New S&E doctorates awarded, 1987	1,094	5
S&E postdoctorates, 1987, in doctorate-granting institutions	984	6
S&E graduate students, 1987, in doctorate-granting institutions	18,995	6
Population, 1987 (000s)	11,582	6
Civilian labor force, 1987 (000s)	5,753	5

FUNDING CHARACTERISTICS ($ millions)	ILLINOIS	RANK
Federal expenditures, 1987	$30,947	8
Federal R&D obligations, 1987	$827	16
Industrial R&D performance, 1985	$3,231	8
Academic R&D performance at doctorate-granting institutions, 1987	$498	7
Total R&D performance, 1985	$4,154	9
Personal income, 1987	$189,332	4
Gross state product, 1986	$209,666	4
Manufacturers shipments, 1986	$123,839	6

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN ILLINOIS
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$826,964	$72,532	$146,236	$567,383	$39,137	$1,676	
Department of Agriculture	30,736	22,727	--	7,997	12	--	8
Department of Commerce	863	--	128	478	--	257	25
Department of Defense	227,580	45,454	136,308	44,715	1,103	--	23
Department of Energy	288,960	119	2,156	277,220	9,465	--	6
Dept. of Health & Human Services	183,449	391	2,481	155,361	24,770	446	8
Dept. of the Interior	3,021	2,158	32	742	--	89	37
Department of Transportation	3,313	162	1,860	280	127	884	17
Environmental Protection Agency	3,163	--	--	2,645	518	--	24
Nat'l Aeronautics & Space Admin.	14,015	1,521	2,486	9,949	59	--	22
National Science Foundation	71,864	--	785	67,996	3,083	--	5
State Rank	16	25	27	5	12	14	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

INDIANA STATE PROFILE

PERSONNEL CHARACTERISTICS	INDIANA	RANK
Scientists, 1986	44,600	17
Engineers, 1986	54,700	13
Doctoral scientists, 1987	6,389	23
Doctoral engineers, 1987	1,051	19
New S&E doctorates awarded, 1987	534	9
S&E postdoctorates, 1987, in doctorate-granting institutions	435	17
S&E graduate students, 1987, in doctorate-granting institutions	8,107	14
Population, 1987 (000s)	5,531	14
Civilian labor force, 1987 (000s)	2,751	14

FUNDING CHARACTERISTICS ($ millions)	INDIANA	RANK
Federal expenditures, 1987	$14,691	18
Federal R&D obligations, 1987	$339	28
Industrial R&D performance, 1985	$1,433	15
Academic R&D performance at doctorate-granting institutions, 1987	$188	20
Total R&D performance, 1985	$1,643	18
Personal income, 1987	$76,520	15
Gross state product, 1986	$84,922	14
Manufacturers shipments, 1986	$75,670	9

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN INDIANA
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$339,429	$64,245	$152,087	$120,830	$987	$1,280	
Department of Agriculture	9,349	3,061	253	6,030	5	--	36
Department of Commerce	122	--	--	122	--	--	40
Department of Defense	213,816	57,353	146,033	10,430	--	--	24
Department of Energy	15,614	--	1,762	13,852	--	--	23
Dept. of Health & Human Services	52,247	--	2,389	49,095	272	491	25
Dept. of the Interior	2,551	1,832	--	719	--	--	44
Department of Transportation	4,458	840	233	2,596	--	789	16
Environmental Protection Agency	1,235	--	--	1,205	30	--	31
Nat'l Aeronautics & Space Admin.	5,735	1,159	1,417	2,479	680	--	29
National Science Foundation	34,302	--	--	34,302	--	--	12
State Rank	28	26	26	21	37	20	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

IOWA STATE PROFILE

PERSONNEL CHARACTERISTICS	IOWA	RANK
Scientists, 1986	16,400	34
Engineers, 1986	26,700	27
Doctoral scientists, 1987	3,721	29
Doctoral engineers, 1987	359	36
New S&E doctorates awarded, 1987	381	17
S&E postdoctorates, 1987, in doctorate-granting institutions	305	22
S&E graduate students, 1987, in doctorate-granting institutions	5,188	23
Population, 1987 (000s)	2,834	29
Civilian labor force, 1987 (000s)	1,448	29

FUNDING CHARACTERISTICS ($ millions)	IOWA	RANK
Federal expenditures, 1987	$8,528	32
Federal R&D obligations, 1987	$162	33
Industrial R&D performance, 1985	$317	30
Academic R&D performance at doctorate-granting institutions, 1987	$157	23
Total R&D performance, 1985	$488	30
Personal income, 1987	$40,218	29
Gross state product, 1986	$43,836	29
Manufacturers shipments, 1986	$31,219	25

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN IOWA
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$162,127	$20,217	$43,578	$97,062	$400	$870	
Department of Agriculture	25,294	16,524	--	8,770	--	--	11
Department of Commerce	168	--	--	168	--	--	39
Department of Defense	48,702	1,486	43,481	3,737	--	--	32
Department of Energy	16,786	--	--	16,786	--	--	21
Dept. of Health & Human Services	54,173	--	--	53,395	--	--	24
Dept. of the Interior	2,484	2,209	--	275	358	420	46
Department of Transportation	450	--	--	--	--	--	31
Environmental Protection Agency	900	--	--	900	--	450	35
Nat'l Aeronautics & Space Admin.	6,922	--	42	6,880	--	--	26
National Science Foundation	6,248	--	55	6,151	42	--	31
State Rank	33	40	33	26	41	30	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

KANSAS STATE PROFILE

PERSONNEL CHARACTERISTICS	KANSAS	RANK
Scientists, 1986	14,800	38
Engineers, 1986	18,200	31
Doctoral scientists, 1987	3,100	35
Doctoral engineers, 1987	399	35
New S&E doctorates awarded, 1987	277	26
S&E postdoctorates, 1987, in doctorate-granting institutions	200	28
S&E graduate students, 1987, in doctorate-granting institutions	4,412	28
Population, 1987 (000s)	2,476	32
Civilian labor force, 1987 (000s)	1,267	31

FUNDING CHARACTERISTICS ($ millions)	KANSAS	RANK
Federal expenditures, 1987	$8,760	30
Federal R&D obligations, 1987	$94	39
Industrial R&D performance, 1985	$285	33
Academic R&D performance at doctorate-granting institutions, 1987	$94	32
Total R&D performance, 1985	$359	36
Personal income, 1987	$37,021	31
Gross state product, 1986	$42,472	30
Manufacturers shipments, 1986	$30,393	26

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN KANSAS
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$94,059	$9,073	$44,464	$39,336	$748	$438	
Department of Agriculture	9,428	4,627	--	4,801	--	--	35
Department of Commerce	15	--	--	15	--	--	47
Department of Defense	53,191	1,739	42,508	8,944	--	--	31
Department of Energy	1,646	--	--	1,646	--	--	40
Dept. of Health & Human Services	19,552	--	1,031	17,404	748	369	35
Dept. of the Interior	2,775	2,691	--	84	--	--	38
Department of Transportation	254	--	104	81	--	69	37
Environmental Protection Agency	798	--	--	798	--	--	36
Nat'l Aeronautics & Space Admin.	2,519	16	767	1,736	--	--	36
National Science Foundation	3,881	--	54	3,827	--	--	39
State Rank	39	46	32	33	40	44	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

KENTUCKY STATE PROFILE

PERSONNEL CHARACTERISTICS	KENTUCKY	RANK
Scientists, 1986	20,200	28
Engineers, 1986	19,100	30
Doctoral scientists, 1987	3,679	31
Doctoral engineers, 1987	296	41
New S&E doctorates awarded, 1987	117	37
S&E postdoctorates, 1987, in doctorate-granting institutions	166	30
S&E graduate students, 1987, in doctorate-granting institutions	2,994	33
Population, 1987 (000s)	3,727	23
Civilian labor force, 1987 (000s)	1,686	25

FUNDING CHARACTERISTICS ($ millions)	KENTUCKY	RANK
Federal expenditures, 1987	$10,367	28
Federal R&D obligations, 1987	$62	42
Industrial R&D performance, 1985	$221	35-39
Academic R&D performance at doctorate-granting institutions, 1987	$78	34
Total R&D performance, 1985	$306	38
Personal income, 1987	$44,541	26
Gross state product, 1986	$53,135	26
Manufacturers shipments, 1986	$37,349	21

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN KENTUCKY
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$62,163	$26,692	$1,651	$32,558	$168	$1,094	
Department of Agriculture	9,595	1,800	--	7,627	168	--	34
Department of Commerce	26	--	26	--	--	--	46
Department of Defense	11,530	10,347	161	1,022	--	--	44
Department of Energy	1,407	--	372	1,035	--	--	42
Dept. of Health & Human Services	31,366	12,440	391	18,535	--	--	30
Dept. of the Interior	2,487	2,105	--	378	--	4	45
Department of Transportation	1,032	--	--	--	--	1,032	26
Environmental Protection Agency	946	--	701	187	--	58	34
Nat'l Aeronautics & Space Admin.	792	--	--	792	--	--	43
National Science Foundation	2,982	--	--	2,982	--	--	44
State Rank	42	33	46	37	50	23	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

MAINE STATE PROFILE

PERSONNEL CHARACTERISTICS	MAINE	RANK
Scientists, 1986	11,400	40
Engineers, 1986	7,300	40
Doctoral scientists, 1987	1,437	43
Doctoral engineers, 1987	313	38
New S&E doctorates awarded, 1987	20	49
S&E postdoctorates, 1987, in doctorate-granting institutions	18	48
S&E graduate students, 1987, in doctorate-granting institutions	614	49
Population, 1987 (000s)	1,187	38
Civilian labor force, 1987 (000s)	587	39

FUNDING CHARACTERISTICS ($ millions)	MAINE	RANK
Federal expenditures, 1987	$4,109	40
Federal R&D obligations, 1987	$179	32
Industrial R&D performance, 1985	$23-$74	40-51
Academic R&D performance at doctorate-granting institutions, 1987	$17	50
Total R&D performance, 1985	$58-$109	43-51
Personal income, 1987	$16,280	40
Gross state product, 1986	$17,326	43
Manufacturers shipments, 1986	$10,092	37

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN MAINE
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$178,618	$5,493	$153,122	$6,106	$12,922	$975	
Department of Agriculture	3,562	862	55	2,611	--	34	46
Department of Commerce	507	--	--	295	42	170	30
Department of Defense	153,421	2,380	150,504	287	250	--	28
Department of Energy	122	--	--	--	122	--	50
Dept. of Health & Human Services	11,573	--	41	611	10,372	549	41
Dept. of the Interior	2,573	2,249	--	324	--	--	43
Department of Transportation	125	2	--	--	--	123	44
Environmental Protection Agency	2,800	--	1,871	781	49	99	25
Nat'l Aeronautics & Space Admin.	653	--	321	25	307	--	45
National Science Foundation	3,282	--	330	1,172	1,780	--	42
State Rank	32	49	25	50	21	26	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

LOUISIANA STATE PROFILE

PERSONNEL CHARACTERISTICS	LOUISIANA	RANK
Scientists, 1986	26,200	25
Engineers, 1986	31,400	24
Doctoral scientists, 1987	4,666	24
Doctoral engineers, 1987	867	23
New S&E doctorates awarded, 1987	166	30
S&E postdoctorates, 1987, in doctorate-granting institutions	246	26
S&E graduate students, 1987, in doctorate-granting institutions	3,438	29
Population, 1987 (000s)	4,461	20
Civilian labor force, 1987 (000s)	1,955	21

FUNDING CHARACTERISTICS ($ millions)	LOUISIANA	RANK
Federal expenditures, 1987	$11,821	26
Federal R&D obligations, 1987	$108	37
Industrial R&D performance, 1985	$187	35-39
Academic R&D performance at doctorate-granting institutions, 1987	$149	25
Total R&D performance, 1985	$349	37
Personal income, 1987	$50,681	23
Gross state product, 1986	$74,426	20
Manufacturers shipments, 1986	$43,861	18

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN LOUISIANA
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$107,721	$34,619	$13,619	$57,092	$750	$1,641	
Department of Agriculture	26,970	21,979	--	4,991	--	--	9
Department of Commerce	987	--	--	629	58	300	22
Department of Defense	18,384	3,034	12,903	2,447	--	--	37
Department of Energy	1,476	--	--	1,476	--	--	41
Dept. of Health & Human Services	45,096	3,086	50	40,949	686	325	28
Dept. of the Interior	5,567	5,154	--	413	--	--	23
Department of Transportation	1,066	--	--	50	--	1,016	24
Environmental Protection Agency	1,059	--	174	879	6	--	33
Nat'l Aeronautics & Space Admin.	3,023	1,366	434	1,223	--	--	35
National Science Foundation	4,093	--	58	4,035	--	--	38
State Rank	37	29	39	30	32	17	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

MARYLAND STATE PROFILE

PERSONNEL CHARACTERISTICS	MARYLAND	RANK
Scientists, 1986	66,600	10
Engineers, 1986	47,600	16
Doctoral scientists, 1987	15,613	7
Doctoral engineers, 1987	2,199	10
New S&E doctorates awarded, 1987	385	15
S&E postdoctorates, 1987, in doctorate-granting institutions	935	7
S&E graduate students, 1987, in doctorate-granting institutions	6,497	20
Population, 1987 (000s)	4,535	19
Civilian labor force, 1987 (000s)	2,402	17

FUNDING CHARACTERISTICS ($ millions)	MARYLAND	RANK
Federal expenditures, 1987	$23,186	11
Federal R&D obligations, 1987	$4,036	2
Industrial R&D performance, 1985	$1,437	14
Academic R&D performance at doctorate-granting institutions, 1987	$710	5
Total R&D performance, 1985	$4,951	6
Personal income, 1987	$80,367	14
Gross state product, 1986	$76,504	18
Manufacturers shipments, 1986	$26,068	27

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN MARYLAND
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$4,035,687	$2,507,150	$1,109,888	$374,339	$41,427	$2,883	
Department of Agriculture	82,342	77,419	281	4,568	24	50	2
Department of Commerce	123,196	117,240	3,510	2,247	24	175	1
Department of Defense	1,952,329	996,049	801,516	151,557	3,207	--	3
Department of Energy	39,217	22,310	8,419	8,025	463	--	17
Dept. of Health & Human Services	1,362,602	1,072,893	107,598	166,064	15,198	849	1
Dept. of the Interior	12,737	12,087	--	621	--	29	9
Department of Transportation	39,129	23,266	13,722	396	80	1,665	1
Environmental Protection Agency	16,035	2,444	11,749	1,477	250	115	8
Nat'l Aeronautics & Space Admin.	378,587	183,250	161,916	12,860	20,561	--	2
National Science Foundation	29,513	192	1,177	26,524	1,620	--	14
State Rank	2	1	9	7	11	9	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

MASSACHUSETTS STATE PROFILE

PERSONNEL CHARACTERISTICS	MASSACHUSETTS	RANK
Scientists, 1986	90,200	7
Engineers, 1986	102,200	8
Doctoral scientists, 1987	16,186	5
Doctoral engineers, 1987	2,857	8
New S&E doctorates awarded, 1987	1,122	3
S&E postdoctorates, 1987, in doctorate-granting institutions	2,958	2
S&E graduate students, 1987, in doctorate-granting institutions	21,270	4
Population, 1987 (000s)	5,855	13
Civilian labor force, 1987 (000s)	3,086	11

FUNDING CHARACTERISTICS ($ millions)	MASSACHUSETTS	RANK
Federal expenditures, 1987	$25,513	9
Federal R&D obligations, 1987	$3,910	3
Industrial R&D performance, 1985	$4,173	5
Academic R&D performance at doctorate-granting institutions, 1987	$719	4
Total R&D performance, 1985	$6,022	5
Personal income, 1987	$110,821	10
Gross state product, 1986	$115,526	10
Manufacturers shipments, 1986	$60,983	13

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN MASSACHUSETTS
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$3,910,013	$575,855	$1,839,239	$857,515	$631,621	$5,783	
Department of Agriculture	16,397	12,015	--	4,382	--	--	20
Department of Commerce	23,672	19,325	1,703	2,074	280	209	7
Department of Defense	3,017,887	509,104	1,764,380	405,666	338,737	--	2
Department of Energy	59,236	--	5,299	53,449	488	--	14
Dept. of Health & Human Services	558,031	2,259	33,600	255,691	262,185	4,296	4
Dept. of the Interior	3,479	2,283	111	880	205	--	33
Department of Transportation	37,479	29,717	2,033	5,028	--	701	3
Environmental Protection Agency	22,815	--	13,750	4,510	4,059	496	4
Nat'l Aeronautics & Space Admin.	50,776	1,081	13,358	19,031	17,306	--	13
National Science Foundation	120,241	71	5,005	106,804	8,361	--	4
State Rank	3	8	2	3	1	4	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

MICHIGAN STATE PROFILE

	MICHIGAN	RANK
PERSONNEL CHARACTERISTICS		
Scientists, 1986	77,200	9
Engineers, 1986	114,000	5
Doctoral scientists, 1987	10,927	11
Doctoral engineers, 1987	2,390	10
New S&E doctorates awarded, 1987	710	8
S&E postdoctorates, 1987, in doctorate-granting institutions	682	10
S&E graduate students, 1987, in doctorate-granting institutions	14,314	8
Population, 1987 (000s)	9,200	8
Civilian labor force, 1987 (000s)	4,523	8

	MICHIGAN	RANK
FUNDING CHARACTERISTICS ($ millions)		
Federal expenditures, 1987	$23,348	10
Federal R&D obligations, 1987	$463	22
Industrial R&D performance, 1985	$1,671	3
Academic R&D performance at doctorate-granting institutions, 1987	$197	8
Total R&D performance, 1985	$6,370	4
Personal income, 1987	$141,034	9
Gross state product, 1986	$153,240	9
Manufacturers shipments, 1986	$142,574	4

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN MICHIGAN
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total $463,360	Federal Intramural $87,344	Industrial Firms $165,376	Univer. & Colleges $209,724	Other Nonprofit $20,360	State & Local Gov't $1,168	Rank
Department of Agriculture	14,438	4,800	9	9,589	--	--	22
Department of Commerce	1,772	1,163	--	609	--	--	11
Department of Defense	200,635	68,240	117,578	12,673	2,335	--	25
Department of Energy	27,947	--	19,552	8,395	--	--	18
Dept. of Health & Human Services	148,920	403	4,251	126,329	17,181	756	11
Dept. of the Interior	5,143	4,911	--	212	--	18	25
Department of Transportation	2,065	187	582	802	--	594	19
Environmental Protection Agency	6,068	4,228	199	1,474	35	--	17
Nat'l Aeronautics & Space Admin.	15,813	333	5,332	10,148	--	--	25
National Science Foundation	37,553	--	112	36,437	804	--	10
State Rank	22	22	28	10	14	22	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, 1991

MINNESOTA STATE PROFILE

	MINNESOTA	RANK
PERSONNEL CHARACTERISTICS		
Scientists, 1986	40,800	20
Engineers, 1986	48,500	15
Doctoral scientists, 1987	7,207	16
Doctoral engineers, 1987	852	24
New S&E doctorates awarded, 1987	305	21
S&E postdoctorates, 1987, in doctorate-granting institutions	416	18
S&E graduate students, 1987, in doctorate-granting institutions	5,608	21
Population, 1987 (000s)	4,246	21
Civilian labor force, 1987 (000s)	2,259	19

	MINNESOTA	RANK
FUNDING CHARACTERISTICS ($ millions)		
Federal expenditures, 1987	$13,227	22
Federal R&D obligations, 1987	$506	21
Industrial R&D performance, 1985	$1,971	12
Academic R&D performance at doctorate-granting institutions, 1987	$222	16
Total R&D performance, 1985	$2,211	15
Personal income, 1987	$67,010	20
Gross state product, 1986	$75,626	19
Manufacturers shipments, 1986	$42,790	19

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN MINNESOTA
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total $506,484	Federal Intramural $26,358	Industrial Firms $319,677	Univer. & Colleges $120,098	Other Nonprofit $38,684	State & Local Gov't $1,617	Rank
Department of Agriculture	16,908	10,789	75	6,044	--	--	19
Department of Commerce	355	--	--	355	--	--	32
Department of Defense	310,846	462	305,993	4,240	151	--	21
Department of Energy	4,778	--	--	4,778	--	--	34
Dept. of Health & Human Services	125,313	--	2,372	83,520	38,215	1,206	13
Dept. of the Interior	11,024	10,453	72	499	--	--	10
Department of Transportation	1,447	--	--	1,036	--	411	22
Environmental Protection Agency	6,809	4,654	824	1,301	--	--	14
Nat'l Aeronautics & Space Admin.	11,960	--	9,967	1,993	--	--	24
National Science Foundation	17,024	--	374	16,332	318	--	21
State Rank	21	34	20	25	13	18	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, 1991

MISSISSIPPI STATE PROFILE

PERSONNEL CHARACTERISTICS	MISSISSIPPI	RANK
Scientists, 1986	15,500	37
Engineers, 1986	10,000	36
Doctoral scientists, 1987	2,151	38
Doctoral engineers, 1987	477	34
New S&E doctorates awarded, 1987	126	35
S&E postdoctorates, 1987, in doctorate-granting institutions	58	39
S&E graduate students, 1987, in doctorate-granting institutions	2,357	36
Population, 1987 (000s)	2,625	31
Civilian labor force, 1987 (000s)	1,151	32

FUNDING CHARACTERISTICS ($ millions)	MISSISSIPPI	RANK
Federal expenditures, 1987	$8,725	31
Federal R&D obligations, 1987	$184	31
Industrial R&D performance, 1985	$62	40-51
Academic R&D performance at doctorate-granting institutions, 1987	$58	37
Total R&D performance, 1985	$245	39-42
Personal income, 1987	$26,781	33
Gross state product, 1986	$31,830	32
Manufacturers shipments, 1986	$21,719	31

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN MISSISSIPPI
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$184,473	$127,489	$15,992	$35,296	$5,056	$640	
Department of Agriculture	34,911	25,694	--	8,642	573	2	6
Department of Commerce	6,604	1,390	895	844	3,400	75	9
Department of Defense	100,293	84,027	5,633	10,588	45	--	29
Department of Energy	3,398	--	300	3,098	--	--	35
Dept. of Health & Human Services	9,841	--	122	9,567	--	152	42
Dept. of the Interior	3,727	3,628	--	99	--	--	30
Department of Transportation	898	465	--	72	--	361	28
Environmental Protection Agency	2,150	1,658	--	467	--	25	27
Nat'l Aeronautics & Space Admin.	21,248	10,627	9,042	516	1,038	25	17
National Science Foundation	1,403	--	--	1,403	--	--	47
State Rank	32	17	38	35	30	36	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

MISSOURI STATE PROFILE

PERSONNEL CHARACTERISTICS	MISSOURI	RANK
Scientists, 1986	53,300	15
Engineers, 1986	46,300	17
Doctoral scientists, 1987	6,602	20
Doctoral engineers, 1987	1,039	20
New S&E doctorates awarded, 1987	294	23
S&E postdoctorates, 1987, in doctorate-granting institutions	487	15
S&E graduate students, 1987, in doctorate-granting institutions	6,877	19
Population, 1987 (000s)	5,103	15
Civilian labor force, 1987 (000s)	2,589	15

FUNDING CHARACTERISTICS ($ millions)	MISSOURI	RANK
Federal expenditures, 1987	$21,063	13
Federal R&D obligations, 1987	$615	19
Industrial R&D performance, 1985	$1,208	16
Academic R&D performance at doctorate-granting institutions, 1987	$207	18
Total R&D performance, 1985	$1,424	19
Personal income, 1987	$74,179	16
Gross state product, 1986	$83,534	15
Manufacturers shipments, 1986	$58,248	14

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN MISSOURI
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$614,622	$46,007	$424,226	$128,319	$14,878	$1,192	
Department of Agriculture	12,329	4,369	--	7,960	--	--	25
Department of Commerce	685	358	--	206	121	--	28
Department of Defense	455,725	31,984	420,463	3,273	5	--	16
Department of Energy	2,201	--	--	2,094	107	--	37
Dept. of Health & Human Services	115,510	75	429	101,724	12,492	790	15
Dept. of the Interior	9,843	8,985	35	811	--	12	12
Department of Transportation	1,053	54	79	3	628	289	25
Environmental Protection Agency	499	--	150	248	--	101	39
Nat'l Aeronautics & Space Admin.	5,631	182	2,720	2,611	118	--	30
National Science Foundation	11,146	--	350	9,389	1,407	--	26
State Rank	19	28	18	18	19	21	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

MONTANA STATE PROFILE

	MONTANA	RANK
PERSONNEL CHARACTERISTICS		
Scientists, 1986	6,000	47
Engineers, 1986	2,100	50
Doctoral scientists, 1987	1,350	45
Doctoral engineers, 1987	87	48
New S&E doctorates awarded, 1987	41	45
S&E postdoctorates, 1987, in doctorate-granting institutions	24	46
S&E graduate students, 1987, in doctorate-granting institutions	891	44
Population, 1987 (000s)	809	44
Civilian labor force, 1987 (000s)	403	44

	MONTANA	RANK
FUNDING CHARACTERISTICS ($ millions)		
Federal expenditures, 1987	$2,887	46
Federal R&D obligations, 1987	$30	48
Industrial R&D performance, 1985	$0-$74	40-51
Academic R&D performance at doctorate-granting institutions, 1987	$30	45
Total R&D performance, 1985	$43-$117	43-51
Personal income, 1987	$9,917	46
Gross state product, 1986	$12,163	46
Manufacturers shipments, 1986	$2,998	46

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN MONTANA
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$30,080	$17,763	$1,457	$10,082	$193	$585	
Department of Agriculture	10,065	7,331	173	2,511	--	50	31
Department of Commerce	92	--	--	92	--	--	41
Department of Defense	1,148	433	440	275	--	--	49
Department of Energy	1,699	950	606	143	--	--	39
Dept. of Health & Human Services	8,881	5,681	49	2,638	193	320	44
Dept. of the Interior	4,030	3,368	139	474	--	49	28
Department of Transportation	166	--	--	--	--	166	42
Environmental Protection Agency	750	--	50	700	--	--	37
Nat'l Aeronautics & Space Admin.	216	--	--	216	--	--	50
National Science Foundation	3,033	--	--	3,033	--	--	43
State Rank	48	42	47	47	49	39	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

NEBRASKA STATE PROFILE

	NEBRASKA	RANK
PERSONNEL CHARACTERISTICS		
Scientists, 1986	16,500	33
Engineers, 1986	8,200	39
Doctoral scientists, 1987	1,091	48
Doctoral engineers, 1987	106	46
New S&E doctorates awarded, 1987	120	36
S&E postdoctorates, 1987, in doctorate-granting institutions	96	35
S&E graduate students, 1987, in doctorate-granting institutions	2,420	35
Population, 1987 (000s)	1,594	36
Civilian labor force, 1987 (000s)	811	34

	NEBRASKA	RANK
FUNDING CHARACTERISTICS ($ millions)		
Federal expenditures, 1987	$5,331	37
Federal R&D obligations, 1987	$49	44
Industrial R&D performance, 1985	$42	40-51
Academic R&D performance at doctorate-granting institutions, 1987	$72	35
Total R&D performance, 1985	$116	43-51
Personal income, 1987	$22,867	34
Gross state product, 1986	$26,521	35
Manufacturers shipments, 1986	$15,057	34

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN NEBRASKA
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$48,922	$21,899	$1,407	$22,686	$1,842	$1,088	
Department of Agriculture	14,763	10,955	--	3,796	12	--	21
Department of Commerce	235	--	--	235	--	--	36
Department of Defense	10,817	8,503	1,309	826	179	--	45
Department of Energy	492	--	--	492	--	--	46
Dept. of Health & Human Services	14,455	--	--	12,064	1,651	740	39
Dept. of the Interior	2,654	2,441	8	190	--	15	40
Department of Transportation	333	--	--	--	--	333	35
Environmental Protection Agency	60	--	--	60	--	--	48
Nat'l Aeronautics & Space Admin.	853	--	90	763	--	--	41
National Science Foundation	4,260	--	--	4,260	--	--	37
State Rank	44	37	48	42	36	27	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

NEVADA STATE PROFILE

PERSONNEL CHARACTERISTICS	NEVADA	RANK
Scientists, 1986	20,100	29
Engineers, 1986	4,500	45
Doctoral scientists, 1987	4,246	27
Doctoral engineers, 1987	1,474	15
New S&E doctorates awarded, 1987	18	50
S&E postdoctorates, 1987, in doctorate-granting institutions	27	43
S&E graduate students, 1987, in doctorate-granting institutions	642	48
Population, 1987 (000s)	1,007	41
Civilian labor force, 1987 (000s)	556	40

FUNDING CHARACTERISTICS ($ millions)	NEVADA	RANK
Federal expenditures, 1987	$3,461	41
Federal R&D obligations, 1987	$462	23
Industrial R&D performance, 1985	$28-$74	40-51
Academic R&D performance at doctorate-granting institutions, 1987	$28	46
Total R&D performance, 1985	$127-$173	39-42
Personal income, 1987	$16,074	41
Gross state product, 1986	$19,426	40
Manufacturers shipments, 1986	$2,225	48

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN NEVADA
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$462,009	$76,509	$367,457	$17,352	$233	$458	
Department of Agriculture	2,343	719	--	1,624	--	--	50
Department of Commerce	1,030	--	14	612	--	404	20
Department of Defense	77,194	61,276	12,348	3,570	--	--	30
Department of Energy	361,286	4,446	354,730	2,100	10	--	4
Dept. of Health & Human Services	3,266	--	50	2,993	223	--	46
Dept. of the Interior	8,432	7,100	41	1,271	--	20	14
Department of Transportation	34	--	--	--	--	34	50
Environmental Protection Agency	5,446	2,523	--	2,923	--	--	18
Nat'l Aeronautics & Space Admin.	969	445	219	305	--	--	40
National Science Foundation	2,009	--	55	1,954	--	--	45
State Rank	23	24	19	43	45	42	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

NEW HAMPSHIRE STATE PROFILE

PERSONNEL CHARACTERISTICS	NEW HAMPSHIRE	RANK
Scientists, 1986	12,300	39
Engineers, 1986	12,000	34
Doctoral scientists, 1987	1,305	46
Doctoral engineers, 1987	207	44
New S&E doctorates awarded, 1987	62	40
S&E postdoctorates, 1987, in doctorate-granting institutions	66	37
S&E graduate students, 1987, in doctorate-granting institutions	886	45
Population, 1987 (000s)	1,057	40
Civilian labor force, 1987 (000s)	588	38

FUNDING CHARACTERISTICS ($ millions)	NEW HAMPSHIRE	RANK
Federal expenditures, 1987	$3,042	44
Federal R&D obligations, 1987	$83	40
Industrial R&D performance, 1985	$294	32
Academic R&D performance at doctorate-granting institutions, 1987	$48	39
Total R&D performance, 1985	$368	35
Personal income, 1987	$18,110	37
Gross state product, 1986	$18,518	42
Manufacturers shipments, 1986	$9,443	38

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN NEW HAMPSHIRE
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$83,358	$19,006	$31,069	$32,732	$196	$355	
Department of Agriculture	3,530	1,592	--	1,938	--	--	47
Department of Commerce	275	--	--	275	--	--	34
Department of Defense	44,430	15,382	27,112	1,936	--	--	33
Department of Energy	984	--	--	984	--	--	43
Dept. of Health & Human Services	17,617	--	193	17,033	196	195	37
Dept. of the Interior	1,864	1,780	--	84	--	--	48
Department of Transportation	182	117	25	--	--	40	40
Environmental Protection Agency	466	--	--	346	--	120	40
Nat'l Aeronautics & Space Admin.	8,706	--	3,067	5,639	--	--	25
National Science Foundation	5,304	135	672	4,497	--	--	34
State Rank	40	41	34	36	48	46	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

NEW JERSEY STATE PROFILE

PERSONNEL CHARACTERISTICS	NEW JERSEY	RANK
Scientists, 1986	87,900	8
Engineers, 1986	97,900	9
Doctoral scientists, 1987	14,003	9
Doctoral engineers, 1987	4,224	4
New S&E doctorates awarded, 1987	382	16
S&E postdoctorates, 1987, in doctorate-granting institutions	507	13
S&E graduate students, 1987, in doctorate-granting institutions	10,443	10
Population, 1987 (000s)	7,672	9
Civilian labor force, 1987 (000s)	3,966	9

FUNDING CHARACTERISTICS ($ millions)	NEW JERSEY	RANK
Federal expenditures, 1987	$23,031	12
Federal R&D obligations, 1987	$1,115	15
Industrial R&D performance, 1985	$5,547	4
Academic R&D performance at doctorate-granting institutions, 1987	$216	17
Total R&D performance, 1985	$6,722	3
Personal income, 1987	$153,961	8
Gross state product, 1986	$154,765	8
Manufacturers shipments, 1986	$73,085	10

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN NEW JERSEY
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$1,114,770	$255,275	$657,601	$191,866	$6,946	$3,082	
Department of Agriculture	3,941	296	--	3,630	15	--	45
Department of Commerce	11,205	10,251	77	807	10	60	8
Department of Defense	772,540	210,646	545,651	15,369	874	--	15
Department of Energy	97,301	--	2,871	94,430	--	--	11
Dept. of Health & Human Services	57,723	72	4,512	46,169	5,231	1,739	23
Dept. of the Interior	3,561	3,015	--	417	--	129	32
Department of Transportation	29,742	24,827	3,691	70	--	1,154	5
Environmental Protection Agency	7,715	5,360	1,470	845	40	--	12
Nat'l Aeronautics & Space Admin.	81,433	808	77,057	3,482	86	--	10
National Science Foundation	49,609	--	22,272	26,647	690	--	8
State Rank	15	12	13	11	26	8	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

NEW MEXICO STATE PROFILE

PERSONNEL CHARACTERISTICS	NEW MEXICO	RANK
Scientists, 1986	15,900	36
Engineers, 1986	10,500	35
Doctoral scientists, 1987	941	49
Doctoral engineers, 1987	54	49
New S&E doctorates awarded, 1987	132	33
S&E postdoctorates, 1987, in doctorate-granting institutions	75	36
S&E graduate students, 1987, in doctorate-granting institutions	2,815	34
Population, 1987 (000s)	1,500	37
Civilian labor force, 1987 (000s)	685	37

FUNDING CHARACTERISTICS ($ millions)	NEW MEXICO	RANK
Federal expenditures, 1987	$7,366	34
Federal R&D obligations, 1987	$1,998	9
Industrial R&D performance, 1985	$690-$799	21-22
Academic R&D performance at doctorate-granting institutions, 1987	$128	28
Total R&D performance, 1985	$2,545-$2,654	11-12
Personal income, 1987	$17,510	38
Gross state product, 1986	$23,603	38
Manufacturers shipments, 1986	$3,776	44

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN NEW MEXICO
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$1,997,979	$420,821	$882,564	$682,702	$11,404	$488	
Department of Agriculture	4,313	1,916	--	2,397	--	--	42
Department of Commerce	46	--	--	46	--	--	44
Department of Defense	873,679	402,302	312,570	155,289	3,477	41	13
Department of Energy	1,072,731	882	567,719	497,801	6,329	--	1
Dept. of Health & Human Services	19,015	2,530	--	14,930	1,451	104	36
Dept. of the Interior	3,717	3,357	89	234	--	37	31
Department of Transportation	383	--	77	--	--	306	33
Environmental Protection Agency	1,165	--	973	192	--	--	32
Nat'l Aeronautics & Space Admin.	17,456	9,803	666	6,772	--	--	20
National Science Foundation	5,474	31	470	4,789	147	--	33
State Rank	9	9	10	4	23	41	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

NEW YORK STATE PROFILE

PERSONNEL CHARACTERISTICS	NEW YORK	RANK
Scientists, 1986	177,800	2
Engineers, 1986	184,300	2
Doctoral scientists, 1987	36,737	2
Doctoral engineers, 1987	5,137	2
New S&E doctorates awarded, 1987	2,048	2
S&E postdoctorates, 1987, in doctorate-granting institutions	2,382	3
S&E graduate students, 1987, in doctorate-granting institutions	41,289	2
Population, 1987 (000s)	17,825	2
Civilian labor force, 1987 (000s)	8,482	2

FUNDING CHARACTERISTICS ($ millions)	NEW YORK	RANK
Federal expenditures, 1987	$60,252	2
Federal R&D obligations, 1987	$2,941	4
Industrial R&D performance, 1985	$7,019	2
Academic R&D performance at doctorate-granting institutions, 1987	$1,150	2
Total R&D performance, 1985	$8,571	2
Personal income, 1987	$321,832	2
Gross state product, 1986	$362,736	2
Manufacturers shipments, 1986	$138,122	5

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN NEW YORK
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$2,941,466	$160,073	$1,654,651	$940,354	$136,901	$49,487	
Department of Agriculture	22,447	11,757	10	10,085	595	--	14
Department of Commerce	1,170	--	132	1,038	--	--	18
Department of Defense	1,614,450	126,554	1,421,065	63,676	3,155	--	6
Department of Energy	400,371	8,979	200,227	190,674	488	3	3
Dept. of Health & Human Services	681,184	1,442	8,579	507,963	116,745	46,455	3
Dept. of the Interior	6,194	4,230	--	1,964	--	--	20
Department of Transportation	7,554	2,807	1,368	1,087	150	2,142	12
Environmental Protection Agency	9,502	--	645	6,870	1,387	600	11
Nat'l Aeronautics & Space Admin.	44,460	4,304	21,404	14,442	4,070	240	14
National Science Foundation	154,134	--	1,221	142,555	10,311	47	3
State Rank	4	14	3	2	3	1	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

NORTH CAROLINA STATE PROFILE

PERSONNEL CHARACTERISTICS	NORTH CAROLINA	RANK
Scientists, 1986	37,000	22
Engineers, 1986	45,900	19
Doctoral scientists, 1987	9,575	13
Doctoral engineers, 1987	1,110	16
New S&E doctorates awarded, 1987	496	11
S&E postdoctorates, 1987, in doctorate-granting institutions	721	9
S&E graduate students, 1987, in doctorate-granting institutions	8,079	15
Population, 1987 (000s)	6,413	10
Civilian labor force, 1987 (000s)	3,276	10

FUNDING CHARACTERISTICS ($ millions)	NORTH CAROLINA	RANK
Federal expenditures, 1987	$16,598	16
Federal R&D obligations, 1987	$584	20
Industrial R&D performance, 1985	$797	21-22
Academic R&D performance at doctorate-granting institutions, 1987	$314	11
Total R&D performance, 1985	$1,193	22
Personal income, 1987	$84,366	13
Gross state product, 1986	$100,961	13
Manufacturers shipments, 1986	$84,935	8

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN NORTH CAROLINA
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$583,706	$129,508	$192,365	$232,166	$27,995	$1,672	
Department of Agriculture	24,683	13,427	113	11,143	--	--	12
Department of Commerce	754	195	--	489	--	70	26
Department of Defense	190,912	35,764	139,653	12,670	2,825	--	26
Department of Energy	6,123	--	997	5,126	--	--	29
Dept. of Health & Human Services	250,868	55,312	4,918	168,616	21,263	759	6
Dept. of the Interior	3,061	2,712	--	349	--	--	36
Department of Transportation	20,373	33	19,297	671	--	372	7
Environmental Protection Agency	54,449	21,654	25,331	5,686	1,612	366	1
Nat'l Aeronautics & Space Admin	6,886	353	546	3,520	2,467	--	27
National Science Foundation	25,597	58	1,510	23,896	28	105	15
State Rank	20	16	23	9	14	15	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

NORTH DAKOTA STATE PROFILE

PERSONNEL CHARACTERISTICS	NORTH DAKOTA	RANK
Scientists, 1986	4,700	48
Engineers, 1986	1,400	51
Doctoral scientists, 1987	2,284	36
Doctoral engineers, 1987	347	34
New S&E doctorates awarded, 1987	48	43
S&E postdoctorates, 1987, in doctorate-granting institutions	26	44
S&E graduate students, 1987, in doctorate-granting institutions	915	43
Population, 1987 (000s)	672	46
Civilian labor force, 1987 (000s)	331	48

FUNDING CHARACTERISTICS ($ millions)	NORTH DAKOTA	RANK
Federal expenditures, 1987	$3,002	45
Federal R&D obligations, 1987	$29	49
Industrial R&D performance, 1985	$10	40-51
Academic R&D performance at doctorate-granting institutions, 1987	$39	40
Total R&D performance, 1985	$57	43-51
Personal income, 1987	$8,777	49
Gross state product, 1986	$10,733	49
Manufacturers shipments, 1986	$2,281	47

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN NORTH DAKOTA
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$29,351	$20,343	$54	$8,409	$232	$313	
Department of Agriculture	18,166	14,803	--	3,363	--	--	18
Department of Commerce	351	--	--	94	--	257	33
Department of Defense	614	6	30	578	--	--	50
Department of Energy	135	--	--	135	--	--	49
Dept. of Health & Human Services	1,386	--	--	1,148	232	6	47
Dept. of the Interior	6,383	5,534	4	845	--	--	18
Department of Transportation	1,000	--	--	950	--	50	27
Environmental Protection Agency	68	--	--	68	--	--	47
Nat'l Aeronautics & Space Admin.	81	--	20	61	--	--	51
National Science Foundation	1,167	--	--	1,167	--	--	49
State Rank	49	39	50	49	46	47	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

OHIO STATE PROFILE

PERSONNEL CHARACTERISTICS	OHIO	RANK
Scientists, 1986	104,600	5
Engineers, 1986	113,200	6
Doctoral scientists, 1987	14,029	8
Doctoral engineers, 1987	3,233	6
New S&E doctorates awarded, 1987	777	7
S&E postdoctorates, 1987, in doctorate-granting institutions	657	11
S&E graduate students, 1987, in doctorate-granting institutions	19,340	5
Population, 1987 (000s)	10,784	7
Civilian labor force, 1987 (000s)	5,248	7

FUNDING CHARACTERISTICS ($ millions)	OHIO	RANK
Federal expenditures, 1987	$31,207	7
Federal R&D obligations, 1987	$1,864	11
Industrial R&D performance, 1985	$2,847	9
Academic R&D performance at doctorate-granting institutions, 1987	$329	9
Total R&D performance, 1985	$3,688	10
Personal income, 1987	$156,826	7
Gross state product, 1986	$176,102	7
Manufacturers shipments, 1986	$145,539	3

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN OHIO
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$1,863,723	$991,290	$641,762	$183,631	$44,676	$2,364	
Department of Agriculture	13,290	5,716	--	7,566	--	8	24
Department of Commerce	222	--	1	221	--	--	37
Department of Defense	1,347,742	775,956	539,929	23,780	8,077	--	10
Department of Energy	55,935	22,020	24,877	4,373	4,665	--	15
Dept. of Health & Human Services	151,621	10,000	3,804	109,163	28,557	97	9
Dept. of the Interior	2,601	2,169	27	405	--	--	42
Department of Transportation	7,050	3,931	1,208	190	49	1,672	14
Environmental Protection Agency	32,009	17,362	11,794	2,175	540	138	2
Nat'l Aeronautics & Space Admin.	239,848	154,136	59,849	13,860	2,554	449	7
National Science Foundation	22,405	--	273	21,898	234	--	18
State Rank	11	4	15	13	9	11	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

OKLAHOMA STATE PROFILE

[illegible]	OKLAHOMA	RANK
PERSONAL CHARACTERISTICS		
Scientists, 1986	23,510	27
Engineers, 1986	29,000	28
Doctoral scientists, 1987	3,714	31
Doctoral engineers, 1987	776	27
New S&E doctorates awarded, 1987	191	29
S&E postdoctorates, 1987, in doctorate-granting institutions	142	31
S&E graduate students, 1987, in doctorate-granting institutions	4,440	27
Population, 1987 (000s)	3,270	27
Civilian labor force, 1987 (000s)	1,594	28

FUNDING CHARACTERISTICS ($ millions)	OKLAHOMA	RANK
Federal expenditures, 1987	$10,349	25
Federal R&D obligations, 1987	$152	38
Industrial R&D performance, 1985	$34	31
Academic R&D performance at doctorate-granting institutions, 1987	$89	31
Total R&D performance, 1985	$403	34
Personal income, 1987	$41,568	27
Gross state product, 1986	$41,814	27
Manufacturers shipments, 1986	$22,595	28

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN OKLAHOMA
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal intramural	Industrial firms	Univer. & Colleges	Other Nonprofit	State & local Gov't	Rank
	$101,778	$33,729	$21,452	$28,861	$17,242	$594	
Department of Agriculture	12,203	7,166	--	4,936	101	2	24
Department of Commerce	3,113	2,758	--	171	--	--	13
Department of Defense	29,519	11,287	14,471	1,551	--	--	34
Department of Energy	13,525	919	1,341	4,558	7,203	--	25
Dept. of Health & Human Services	16,130	--	202	8,343	6,813	212	28
Dept. of the Interior	5,225	2,871	--	169	--	185	31
Department of Transportation	1,348	4,949	344	--	--	154	15
Environmental Protection Agency	13,360	3,128	3,004	1,134	3,343	6	12
Nat'l Aeronautics & Space Admin.	3,795	423	--	3,213	112	--	32
National Science Foundation	4,328	--	219	4,109	4	--	42
State Govt	30	31	34	45	17	45	

* Rank as reported by funding agencies.

SOURCE: National Science Foundation, 1991

OREGON STATE PROFILE

[illegible]	OREGON	RANK
PERSONAL CHARACTERISTICS		
Scientists, 1986	21,750	29
Engineers, 1986	23,500	29
Doctoral scientists, 1987	4,348	25
Doctoral engineers, 1987	525	32
New S&E doctorates awarded, 1987	148	28
S&E postdoctorates, 1987, in doctorate-granting institutions	196	29
S&E graduate students, 1987, in doctorate-granting institutions	5,758	21
Population, 1987 (000s)	2,724	33
Civilian labor force, 1987 (000s)	1,367	33

FUNDING CHARACTERISTICS ($ millions)	OREGON	RANK
Federal expenditures, 1987	$7,532	33
Federal R&D obligations, 1987	$154	34
Industrial R&D performance, 1985	$285	34
Academic R&D performance at doctorate-granting institutions, 1987	$152	27
Total R&D performance, 1985	$450	33
Personal income, 1987	$37,824	33
Gross state product, 1986	$41,278	31
Manufacturers shipments, 1986	$21,753	31

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN OREGON
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal intramural	Industrial firms	Univer. & Colleges	Other Nonprofit	State & local Gov't	Rank
	$131,351	$31,317	$8,371	$77,572	$13,347	$743	
Department of Agriculture	25,366	11,911	--	8,445	--	10	16
Department of Commerce	1,349	--	151	1,175	--	23	37
Department of Defense	11,541	52	3,348	7,543	--	--	43
Department of Energy	5,675	855	1,855	2,753	--	124	31
Dept. of Health & Human Services	68,576	--	524	55,140	14,755	155	20
Dept. of the Interior	16,948	15,157	174	1,346	--	91	9
Department of Transportation	1,972	--	--	1,851	--	244	21
Environmental Protection Agency	4,276	3,331	145	2,559	--	--	16
Nat'l Aeronautics & Space Admin.	3,153	61	1,746	1,345	212	--	34
National Science Foundation	17,892	--	1,171	14,756	10	--	20
State Govt	34	32	43	27	19	32	

* Rank as reported by funding agencies.

SOURCE: National Science Foundation, 1991

PENNSYLVANIA STATE PROFILE

	PENNSYLVANIA	RANK
PERSONAL CHARACTERISTICS		
Scientists, 1986	125,800	4
Engineers, 1986	117,800	4
Doctoral scientists, 1987	17,343	4
Doctoral engineers, 1987	3,434	4
New S&E doctorates awarded, 1987	974	4
S&E postdoctorates, 1987, in doctorate-granting institutions	1,156	5
S&E graduate students, 1987, in doctorate-granting institutions	18,272	7
Population, 1987 (000s)	11,936	5
Civilian labor force, 1987 (000s)	5,868	6

	PENNSYLVANIA	RANK
FUNDING CHARACTERISTICS ($ millions)		
Federal expenditures, 1987	$10,153	5
Federal R&D obligations, 1987	$1,602	12
Industrial R&D performance, 1985	$3,570	6
Academic R&D performance at doctorate-granting institutions, 1987	$635	6
Total R&D performance, 1985	$4,348	8
Personal income, 1987	$170,905	6
Gross state product, 1986	$183,550	5
Manufacturers shipments, 1986	$108,277	7

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN PENNSYLVANIA
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Govts	Rank
	$1,601,942	$284,237	$825,548	$427,444	$83,274	$2,837	
Department of Agriculture	31,894	25,565	274	7,440	126	--	7
Department of Commerce	910	70	3	833	230	--	24
Department of Defense	967,482	190,427	555,885	184,566	11,411	--	4
Department of Energy	208,517	35,884	144,951	15,375	786	--	5
Dept. of Health & Human Services	335,175	72	5,985	223,953	74,441	574	3
Dept. of the Interior	30,134	27,825	208	2,081	--	52	8
Department of Transportation	7,535	143	3,042	2,311	--	2,288	15
Environmental Protection Agency	4,747	--	2,170	1,200	276	--	20
NASA Aeronautics & Space Admin.	68,991	1,241	61,518	6,054	742	--	11
National Science Foundation	86,999	--	766	87,974	5,174	--	9
State Rank	12	11	11	8	8	12	

* Data as reported by funding agencies.

KEY: NSF - National Science Foundation, NIH

RHODE ISLAND STATE PROFILE

	RHODE ISLAND	RANK
PERSONAL CHARACTERISTICS		
Scientists, 1986	4,700	44
Engineers, 1986	7,200	42
Doctoral scientists, 1987	1,753	41
Doctoral engineers, 1987	484	33
New S&E doctorates awarded, 1987	161	31
S&E postdoctorates, 1987, in doctorate-granting institutions	110	33
S&E graduate students, 1987, in doctorate-granting institutions	2,374	37
Population, 1987 (000s)	986	43
Civilian labor force, 1987 (000s)	519	47

	RHODE ISLAND	RANK
FUNDING CHARACTERISTICS ($ millions)		
Federal expenditures, 1987	$3,453	42
Federal R&D obligations, 1987	$363	26
Industrial R&D performance, 1985	$108	33-34
Academic R&D performance at doctorate-granting institutions, 1987	$66	34
Total R&D performance, 1985	$213	28
Personal income, 1987	$11,140	42
Gross state product, 1986	$15,205	44
Manufacturers shipments, 1986	$8,428	40

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN RHODE ISLAND
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Govts	Rank
	$303,591	$139,869	$75,148	$41,494	$12,794	$978	
Department of Agriculture	1,345	3	--	1,148	74	--	31
Department of Commerce	951	--	--	951	--	24	23
Department of Defense	214,745	134,234	69,992	9,474	147	--	20
Department of Energy	2,558	--	--	2,354	3	--	34
Dept. of Health & Human Services	26,758	--	677	12,851	12,774	458	21
Dept. of the Interior	1,565	1,481	--	84	--	--	32
Department of Transportation	48	--	--	--	--	48	48
Environmental Protection Agency	4,133	1,241	--	819	25	497	29
NASA Aeronautics & Space Admin.	2,274	11	439	1,762	62	--	27
National Science Foundation	12,990	--	--	11,781	754	--	24
State Rank	34	15	31	32	31	34	

* Data as reported by funding agencies.

KEY: NSF - National Science Foundation, NIH

SOUTH CAROLINA STATE PROFILE

PERSONNEL CHARACTERISTICS	SOUTH CAROLINA	RANK
Scientists, 1986	20,000	30
Engineers, 1986	22,900	28
Doctoral scientists, 1987	3,277	32
Doctoral engineers, 1987	753	29
New S&E doctorates awarded, 1987	129	34
S&E postdoctorates, 1987, in doctorate-granting institutions	102	34
S&E graduate students, 1987, in doctorate-granting institutions	3,698	32
Population, 1987 (000s)	3,425	24
Civilian labor force, 1987 (000s)	1,632	26

FUNDING CHARACTERISTICS ($ millions)	SOUTH CAROLINA	RANK
Federal expenditures, 1987	$10,383	27
Federal R&D obligations, 1987	$124	31
Industrial R&D performance, 1985	$309	27
Academic R&D performance at doctorate-granting institutions, 1987	$66	31
Total R&D performance, 1985	$476	31
Personal income, 1987	$40,615	28
Gross state product, 1986	$44,727	28
Manufacturers shipments, 1986	$36,119	23

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN SOUTH CAROLINA
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$123,640	$11,527	$64,952	$35,853	$10,400	$908	
Department of Agriculture	11,728	6,153	30	5,545	—	—	28
Department of Commerce	1,037	162	421	384	—	70	19
Department of Defense	31,289	2,785	4,489	2,607	10,400	—	36
Department of Energy	61,049	—	58,765	2,334	—	—	13
Dept. of Health & Human Services	20,504	—	761	18,955	—	458	33
Dept. of the Interior	2,633	2,666	—	187	—	—	47
Department of Transportation	176	—	—	—	—	176	47
Environmental Protection Agency	516	—	—	512	—	4	38
Nat'l Aeronautics & Space Admin.	987	7	498	482	—	—	35
National Science Foundation	4,901	—	—	4,901	—	—	31
State Rank	35	45	31	34	24	29	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, 1991

PERSONNEL CHARACTERISTICS	SOUTH DAKOTA	RANK
Scientists, 1986	2,800	51
Engineers, 1986	3,400	49
Doctoral scientists, 1987	1,103	47
Doctoral engineers, 1987	2	51
New S&E doctorates awarded, 1987	30	47
S&E postdoctorates, 1987, in doctorate-granting institutions	6	49
S&E graduate students, 1987, in doctorate-granting institutions	856	46
Population, 1987 (000s)	709	45
Civilian labor force, 1987 (000s)	355	45

FUNDING CHARACTERISTICS ($ millions)	SOUTH DAKOTA	RANK
Federal expenditures, 1987	$2,660	46
Federal R&D obligations, 1987	$13	51
Industrial R&D performance, 1985	$7	40-51
Academic R&D performance at doctorate-granting institutions, 1987	$12	51
Total R&D performance, 1985	$23	41-51
Personal income, 1987	$3,875	48
Gross state product, 1986	$9,812	50
Manufacturers shipments, 1986	$3,938	43

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN SOUTH DAKOTA
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$12,826	$1,680	$1,851	$6,435	$231	$622	
Department of Agriculture	4,158	1,831	—	2,267	—	—	44
Department of Commerce	42	42	—	—	—	—	43
Department of Defense	3	3	—	—	—	—	51
Department of Energy	100	—	—	100	—	—	31
Dept. of Health & Human Services	1,333	—	126	429	231	539	48
Dept. of the Interior	5,282	3,303	1,710	194	—	12	24
Department of Transportation	71	—	—	—	—	71	47
Environmental Protection Agency	118	—	—	118	—	—	45
Nat'l Aeronautics & Space Admin.	794	470	—	324	—	—	42
National Science Foundation	853	—	—	853	—	—	30
State Rank	31	48	45	31	47	31	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, 1991

TENNESSEE STATE PROFILE

PERSONNEL CHARACTERISTICS	TENNESSEE	RANK
Scientists, 1986	34,100	23
Engineers, 1986	36,500	22
Doctoral scientists, 1987	6,442	22
Doctoral engineers, 1987	1,110	17
New S&E doctorates awarded, 1987	242	24
S&E postdoctorates, 1987, in doctorate-granting institutions	410	19
S&E graduate students, 1987, in doctorate-granting institutions	5,117	24
Population, 1987 (000s)	4,855	16
Civilian labor force, 1987 (000s)	2,356	18

FUNDING CHARACTERISTICS ($ millions)	TENNESSEE	RANK
Federal expenditures, 1987	$19,556	17
Federal R&D obligations, 1987	$752	17
Industrial R&D performance, 1985	$535	24
Academic R&D performance at doctorate-granting institutions, 1987	$144	26
Total R&D performance, 1985	$734	27
Personal income, 1987	$67,342	21
Gross state product, 1986	$71,335	21
Manufacturers shipments, 1986	$32,717	19

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN TENNESSEE
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal (Intramural)	Industry/ Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$751,362	$125,359	$472,853	$120,498	$11,819	$833	
Department of Agriculture	6,762	438	74	6,250	127		16
Department of Commerce	700	718	2				27
Department of Defense	353,107	119,548	234,809	8,750			8
Department of Energy	224,851	1,331	205,286	12,344	40		7
Dept. of Health & Human Services	90,213	2,762	2,708	72,436	11,307	949	16
Dept. of the Interior	2,967	2,336		631			30
Department of Transportation	436		62	374		158	32
Environmental Protection Agency	25,354		19,430	600		724	9
NASA: Aeronautics & Space Admin.	78,877	2,402	70,975	2,500			21
National Science Foundation	16,612	275	5,791	9,036			28
State Rank	17	18	17	21	22	17	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, 1989

TEXAS STATE PROFILE

PERSONNEL CHARACTERISTICS	TEXAS	RANK
Scientists, 1986	131,600	3
Engineers, 1986	172,300	3
Doctoral scientists, 1987	19,283	3
Doctoral engineers, 1987	4,401	3
New S&E doctorates awarded, 1987	1,110	4
S&E postdoctorates, 1987, in doctorate-granting institutions	1,430	4
S&E graduate students, 1987, in doctorate-granting institutions	23,628	3
Population, 1987 (000s)	16,789	3
Civilian labor force, 1987 (000s)	8,265	3

FUNDING CHARACTERISTICS ($ millions)	TEXAS	RANK
Federal expenditures, 1987	$47,504	3
Federal R&D obligations, 1987	$2,261	7
Industrial R&D performance, 1985	$3,492	7
Academic RD performance at doctorategranting institutions, 1987	$811	3
Total R&D erformance, 1985	$4,372	7
Personal Income, 1987	$231,085	3
Gross stateproduct, 1986	$303,510	3
Manufactures shipments, 1986	$148,932	2

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN TEXAS
BY AGENCY AN PERFORMER*
FISCAL YAR 1987

(Dollars inThousands)

Funding Agencie	Total	Federal (Intramural)	Industry Firms	Univer. & Colleges	Other Nonprofit	State & Local Govt	Rank
	$6,241,380	$3,413,303	$1,438,8	$371,867	$43,140	$6,622	
Department of Agriculture	47,966	20,484		12,178	117	37	4
Department of Commerce	907			892	242		21
Department of Defense	1,334,447	198,708	1,038,6	47,131	9,189		7
Department of Energy	17,697		4	15,656	1,595		20
Dept. of Health & Human Services	250,430	439	5,2	23,419	11,206	1,880	7
Dept. of the Interior	4,942	4,393		549			26
Department of Transportation	11,251	903	1,8	1,717	1,957	5,423	9
Environmental Protection Agency	15,419		10,9	3,334	1,260	82	9
NASA: Aeronautics & Space Admin.	340,410	167,772	140,6	18,027	17,355		3
National Science Foundation	58,919		2	30,094	219		11
State Rank	7	10		8	10	3	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, 1989

UTAH STATE PROFILE

	UTAH	RANK
PERSONNEL CHARACTERISTICS		
Scientists, 1986	15,900	35
Engineers, 1986	18,000	32
Doctoral scientists, 1987	3,206	34
Doctoral engineers, 1987	1,024	21
New S&E doctorates awarded, 1987	217	27
S&E pos.doctorates, 1987, in doctorate-granting institutions	214	27
S&E graduate students, 1987, in doctorate-granting institutions	4,343	30
Population, 1987 (000s)	1,680	35
Civilian labor force, 1987 (000s)	757	35

	UTAH	RANK
FUNDING CHARACTERISTICS ($ millions)		
Federal expenditures, 1987	$5,705	36
federal R&D obligations, 1987	$427	24
Industrial R&D performance, 1985	$317	29
Academic R&D performance at doctorate-granting institutions, 1987	$121	29
Total R&D performance, 1985	$491	30
Personal income, 1987	$18,894	36
Gross state product, 1986	$24,008	37
Manufacturers shipments, 1986	$10,389	36

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN UTAH
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$427,199	$99,166	$255,391	$69,761	$2,209	$672	
Department of Agriculture	9,672	6,667	--	3,005	--	--	33
Department of Commerce	242	--	10	--	--	232	35
Department of Defense	337,273	82,500	247,026	7,736	11	--	19
Department of Energy	5,856	--	165	4,841	850	--	30
Dept. of Health & Human Services	44,468	--	3,715	39,224	1,268	261	29
Dept. of the Interior	10,717	9,813	--	842	--	62	11
Department of Transportation	189	--	--	72	--	117	39
Environmental Protection Agency	1,419	--	--	1,369	50	--	30
Nat'l Aeronautics & Space Admin.	6,291	186	4,212	1,893	--	--	28
National Science Foundation	11,042	--	263	10,779	--	--	27
State Rank	24	20	21	28	34	35	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

VERMONT STATE PROFILE

	VERMONT	RANK
PERSONNEL CHARACTERISTICS		
Scientists, 1986	3,700	49
Engineers, 1986	3,900	47
Doctoral scientists, 1987	1,468	42
Doctoral engineers, 1987	206	45
New S&E doctorates awarded, 1987	27	48
S&E postdoctorates, 1987, in doctorate-granting institutions	59	38
S&E graduate students, 1987, in doctorate-granting institutions	605	50
Population, 1987 (000s)	548	49
Civilian labor force, 1987 (000s)	296	49

	VERMONT	RANK
FUNDING CHARACTERISTICS ($ millions)		
Federal expenditures, 1987	$1,474	51
Federal R&D obligations, 1987	$40	46
Industrial R&D performance, 1985	$207-$258	35-39
Academic R&D performance at doctorate-granting institutions, 1987	$32	43
Total R&D performance, 1985	$237-$288	39-42
Personal income, 1987	$7,708	50
Gross state product, 1986	$8,636	51
Manufacturers shipments, 1986	$4,153	42

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN VERMONT
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$30,564	$3,710	$12,084	$23,333	$327	$110	
Department of Agriculture	3,435	1,462	--	1,969	--	4	48
Department of Commerce	76	76	--	--	--	--	42
Department of Defense	12,284	724	11,310	250	--	--	42
Department of Energy	208	--	--	208	--	--	48
Dept. of Health & Human Services	19,993	--	152	19,577	258	6	34
Dept. of the Interior	1,557	1,448	--	102	--	7	51
Department of Transportation	75	--	--	--	--	75	45
Environmental Protection Agency	78	--	--	60	--	18	46
Nat'l Aeronautics & Space Admin.	587	--	558	29	--	--	46
National Science Foundation	1,271	--	64	1,138	69	--	48
State Rank	48	50	42	41	43	51	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

VIRGINIA STATE PROFILE

PERSONNEL CHARACTERISTICS	VIRGINIA	RANK
Scientists, 1986	59,400	11
Engineers, 1986	52,700	14
Doctoral scientists, 1987	10,281	12
Doctoral engineers, 1987	2,574	9
New S&E doctorates awarded, 1987	391	13
S&E postdoctorates, 1987, in doctorate-granting institutions	395	20
S&E graduate students, 1987, in doctorate-granting institutions	10,371	11
Population, 1987 (000s)	5,904	12
Civilian labor force, 1987 (000s)	2,989	13

FUNDING CHARACTERISTICS ($ millions)	VIRGINIA	RANK
Federal expenditures, 1987	$31,392	6
Federal R&D obligations, 1987	$2,293	6
Industrial R&D performance, 1985	$800	20
Academic R&D performance at doctorate-granting institutions, 1987	$207	19
Total R&D performance, 1985	$1,947	16
Personal income, 1987	$96,361	11
Gross state product, 1986	$104,155	11
Manufacturers shipments, 1986	$47,346	17

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN VIRGINIA
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$2,292,742	$883,844	$1,158,094	$120,987	$124,680	$5,137	
Department of Agriculture	7,955	1,234	21	6,700	--	--	37
Department of Commerce	3,442	433	2,317	692	--	--	12
Department of Defense	1,771,443	697,941	961,173	10,884	101,445	--	5
Department of Energy	23,568	5,084	6,752	11,752	--	--	19
Dept. of Health & Human Services	85,238	915	16,024	63,205	4,847	247	19
Dept. of the Interior	31,131	24,792	5,658	563	74	44	1
Department of Transportation	37,536	10,799	18,845	55	7,130	907	2
Environmental Protection Agency	31,433	--	29,307	1,426	700	--	3
Nat'l Aeronautics & Space Admin.	281,002	139,122	117,581	10,600	9,842	3,857	5
National Science Foundation	19,974	3,524	636	15,110	642	82	19
State Rank	6	5	7	20	4	5	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

WASHINGTON STATE PROFILE

PERSONNEL CHARACTERISTICS	WASHINGTON	RANK
Scientists, 1986	54,800	12
Engineers, 1986	71,900	11
Doctoral scientists, 1987	8,082	15
Doctoral engineers, 1987	1,524	14
New S&E doctorates awarded, 1987	387	14
S&E postdoctorates, 1987, in doctorate-granting institutions	647	12
S&E graduate students, 1987, in doctorate-granting institutions	5,498	22
Population, 1987 (000s)	4,538	18
Civilian labor force, 1987 (000s)	2,254	20

FUNDING CHARACTERISTICS ($ millions)	WASHINGTON	RANK
Federal expenditures, 1987	$17,619	15
Federal R&D obligations, 1987	$1,879	10
Industrial R&D performance, 1985	$2,183	10
Academic R&D performance at doctorate-granting institutions, 1987	$236	14
Total R&D performance, 1985	$2,596	11-12
Personal income, 1987	$70,091	18
Gross state product, 1986	$77,683	16
Manufacturers shipments, 1986	$42,310	20

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN WASHINGTON
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$1,878,635	$122,468	$1,470,206	$191,449	$91,423	$3,089	
Department of Agriculture	20,901	13,225	170	7,501	5	--	15
Department of Commerce	46,233	43,250	1,194	1,267	92	160	3
Department of Defense	1,416,529	46,152	1,332,338	30,933	7,106	--	8
Department of Energy	160,315	2,695	104,050	8,723	44,847	--	9
Dept. of Health & Human Services	150,278	681	5,174	105,286	38,318	819	10
Dept. of the Interior	14,611	14,140	--	418	2	51	8
Department of Transportation	1,987	2	--	146	--	1,839	20
Environmental Protection Agency	4,180	1,855	926	1,179	--	220	21
Nat'l Aeronautics & Space Admin.	30,316	112	25,729	7,380	95	--	15
National Science Foundation	33,285	86	625	31,616	958	--	13
State Rank	10	19	5	12	7	7	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

WEST VIRGINIA STATE PROFILE

PERSONNEL CHARACTERISTICS	WEST VIRGINIA	RANK
Scientists, 1986	11,000	41
Engineers, 1986	8,500	38
Doctoral scientists, 1987	1,590	41
Doctoral engineers, 1987	310	39
New S&E doctorates awarded, 1987	51	42
S&E postdoctorates, 1987, in doctorate-granting institutions	47	40
S&E graduate students, 1987, in doctorate-granting institutions	1,617	39
Population, 1987 (000s)	1,897	34
Civilian labor force, 1987 (000s)	749	36

FUNDING CHARACTERISTICS ($ millions)	WEST VIRGINIA	RANK
Federal expenditures, 1987	$5,325	38
Federal R&D obligations, 1987	$116	36
Industrial R&D performance, 1985	$94-$242	35-39
Academic R&D performance at doctorate-granting institutions, 1987	$27	47
Total R&D performance, 1985	$153-$301	39-42
Personal income, 1987	$20,791	35
Gross state product, 1986	$24,096	36
Manufacturers shipments, 1986	$10,736	35

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN WEST VIRGINIA
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$115,853	$56,605	$28,941	$29,214	$333	$760	
Department of Agriculture	11,551	8,959	--	2,592	--	--	29
Department of Commerce	--	--	--	--	--	--	51
Department of Defense	23,750	986	21,680	1,084	--	--	35
Department of Energy	42,966	35,467	6,752	747	--	--	16
Dept. of Health & Human Services	12,138	5,622	--	5,903	333	280	40
Dept. of the Interior	7,002	5,567	--	1,235	--	200	15
Department of Transportation	360	4	--	76	--	280	34
Environmental Protection Agency	355	--	--	355	--	--	41
Nat'l Aeronautics & Space Admin.	744	--	509	235	--	--	44
National Science Foundation	16,987	--	--	16,987	--	--	22
State Rank	36	27	35	39	42	33	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

WISCONSIN STATE PROFILE

PERSONNEL CHARACTERISTICS	WISCONSIN	RANK
Scientists, 1986	40,800	21
Engineers, 1986	45,800	20
Doctoral scientists, 1987	7,141	17
Doctoral engineers, 1987	845	25
New S&E doctorates awarded, 1987	516	10
S&E postdoctorates, 1987, in doctorate-granting institutions	496	14
S&E graduate students, 1987, in doctorate-granting institutions	8,218	13
Population, 1987 (000s)	4,807	17
Civilian labor force, 1987 (000s)	2,491	16

FUNDING CHARACTERISTICS ($ millions)	WISCONSIN	RANK
Federal expenditures, 1987	$12,192	25
Federal R&D obligations, 1987	$204	30
Industrial R&D performance, 1985	$476	23
Academic R&D performance at doctorate-granting institutions, 1987	$303	12
Total R&D performance, 1985	$941	24-26
Personal income, 1987	$70,463	17
Gross state product, 1986	$76,922	17
Manufacturers shipments, 1986	$64,130	12

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN WISCONSIN
BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$204,482	$21,745	$16,726	$162,454	$2,829	$728	
Department of Agriculture	23,970	14,765	165	9,040	--	--	13
Department of Commerce	1,634	467	8	1,159	--	--	16
Department of Defense	13,378	375	3,077	9,732	194	--	40
Department of Energy	13,287	--	300	12,987	--	--	26
Dept. of Health & Human Services	99,446	43	1,196	95,328	2,498	381	17
Dept. of the Interior	6,172	6,034	--	117	--	21	21
Department of Transportation	556	--	66	316	--	174	30
Environmental Protection Agency	2,129	--	827	1,202	--	100	28
Nat'l Aeronautics & Space Admin.	18,560	61	10,733	7,764	--	--	18
National Science Foundation	25,350	--	352	24,809	137	52	16
State Rank	30	38	37	16	32	34	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS

WYOMING STATE PROFILE

	WYOMING	RANK
PERSONNEL CHARACTERISTICS		
Scientists, 1986	3,400	50
Engineers, 1986	3,600	48
Doctoral scientists, 1987	767	51
Doctoral engineers, 1987	104	47
New S&E doctorates awarded, 1987	43	44
S&E postdoctorates, 1987, in doctorate-granting institutions	18	47
S&E graduate students, 1987, in doctorate-granting institutions	739	47
Population, 1987 (000s)	490	51
Civilian labor force, 1987 (000s)	240	51

	WYOMING	RANK
FUNDING CHARACTERISTICS ($ millions)		
Federal expenditures, 1987	$1,535	50
Federal R&D obligations, 1987	$23	50
Industrial R&D performance, 1985	$3	40-51
Academic R&D performance at doctorate-granting institutions, 1987	$17	49
Total R&D performance, 1985	$27	43-51
Personal income, 1987	$6,256	51
Gross state product, 1986	$11,683	48
Manufacturers shipments, 1986	$1,835	51

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT IN WYOMING BY AGENCY AND PERFORMER*
FISCAL YEAR 1987

(Dollars in Thousands)

Funding Agency	Total	Federal Intramural	Industrial Firms	Univer. & Colleges	Other Nonprofit	State & Local Gov't	Rank
	$23,453	$8,146	$0	$8,634	$6,341	$332	
Department of Agriculture	5,477	3,766	--	1,711	--	--	40
Department of Commerce	--	--	--	--	--	--	51
Department of Defense	1,296	861	--	435	--	--	48
Department of Energy	6,961	--	--	620	6,341	--	28
Dept. of Health & Human Services	1,136	--	--	918	--	218	49
Dept. of the Interior	4,455	3,519	--	896	--	40	27
Department of Transportation	74	--	--	--	--	74	46
Environmental Protection Agency	135	--	--	135	--	--	44
Nat'l Aeronautics & Space Admin.	511	--	--	511	--	--	48
National Science Foundation	3,408	--	--	3,408	--	--	40
State Rank	50	47	51	48	28	47	

* Data as reported by funding agencies.

SOURCE: National Science Foundation, SRS